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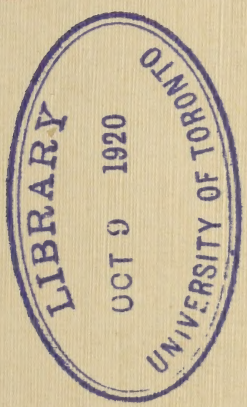
The Movement of Wages In The Cotton Manufacturing Industry of New England Since 1860

STANLEY E. HOWARD



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A DISSERTATION
PRESENTED TO THE
FACULTY OF PRINCETON UNIVERSITY
IN CANDIDACY FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

The Movement of Wages

In the Cotton Manufacturing Industry of New England Since 1860

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BOSTON

NATIONAL COUNCIL OF AMERICAN COTTON MANUFACTURERS

BOSTON, MASS. WASHINGTON, D. C. CHARLOTTE, N. C.

1920

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Printed by E. L. Barry
Waltham, Mass.

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CHAPTER I

The Scope and Method of this Investigation

At a time like the present when there is at hand so much unavoidable and important work of economic and social readjustment, it seems particularly needful that there be on the part of the public both ability and willingness to view the problems that arise in their true perspectives. While in dealing with all economic problems a thoroughgoing knowledge of historical backgrounds is much to be desired, the importance of such knowledge is especially great when forces of great dynamic power have been and still are at work. We are in a period of upheaval in the industrial world. Under the spur of urgent war needs, production attained in terms both of monetary and of technical units unprecedented levels. Labor has been at a premium unprecedented in our industrial history. Money wages have in many industries been very markedly advanced, and that industry is rare in which there has been no advance at all. These wage changes can no more be thought of as standing by themselves than can the diplomatic and military events of 1914-1919. The present monograph is therefore offered in the hope that it may in some measure contribute to public knowledge of historical backgrounds in a particular portion of the field of industrial problems.

There has been chosen as the subject of investigation the changes of wages in the New England cotton manufacturing industry since 1860. Thus there is covered a period of nearly sixty years, embracing two important war periods, those of 1861-1865 and 1914-1919, and both the period of declining price movement preceding 1897 and that of rising prices since that year.

As to form and content the present study is largely statistical. Two general problems have presented themselves: First, the

determination of the detailed facts regarding changes of wages; second, the discovery of the more important causal forces producing these changes. Of these two problems, the former has been stressed, and only in the discussion of the Fall River sliding scale experiments (in Chapter II) and in the analysis and explanation of the results of Professor Mitchell's work covering the greenback period (Chapter III) has there been any considerable attention given to descriptive and explanatory materials gathered from miscellaneous sources and serving to explain the evidence of the statistical exhibits. In Chapter II the analysis of market conditions in their relation to changes of rates of wages approaches more nearly than does any other part of the study the presentation of critical comment. As to the miscellaneous explanatory materials of Chapter III, their chief justification as a part of the present work lies in the light they throw upon the developments of the early years of the period covered—rather important developments in that not only was there in them a radical departure from the pre-war conditions of 1860 so far as concerned cotton mill employees as a group, but also in that in these early years there was established a new relationship of the wage levels of the sexes.

Of the purely statistical part of the subject there are three main divisions. First, there is that which relates to changes of rates of wages rather than to changes of earnings. This topic is treated particularly in Chapter II. Attention has been given to the history of the weaving piece rate at Fall River, Massachusetts, as being at once the best available and a fairly accurate criterion of changes of rates at least for the southern New England section of the cotton manufacturing industry.

Second, there is that division which relates to changes in earnings, and more particularly to changes of full time earnings. It is obvious that in an industry in which the principle of the division of labor has attained a high degree of development, a development which has been accompanied by considerable resort to piece rate methods of payment, changes of rates may or may not result in proportionate changes of earnings, due to the complicating influence of changes in the technical conditions

of production. And again, even if piece rates and hourly earnings do not change, weekly and annual relative earnings may be modified by the enactment of legislation limiting the hours of labor of certain groups of workers, as women and minors — a restriction upon industrial activity which from obvious considerations relating to skillful factory organization and management affects all employees regardless of sex and age. The assembling and analysis of the facts relating to the movement of full time money earnings are presented in Chapters III and IV, the former showing for the period 1860-1891 the conclusions based chiefly, directly or indirectly, upon the materials of the Aldrich Report of 1893;[1] the latter, covering the years 1890-1916, being based upon the work of the United States Bureau of Labor Statistics and of its predecessor the United States Bureau of Labor, and upon the work of the Massachusetts Bureau of Statistics.

Finally, as is necessary in any statistical examination of wage movements, consideration has been given to the occurrence, regularly or irregularly, of conditions of unemployment. Such conditions frequently modify in a substantial degree the showing made by statistics of relative full time earnings. This topic has been treated in Chapter V.

In Chapter VI there is presented a summary of the statistical analysis just outlined. The curves of relative full time earnings in the Massachusetts section of the cotton manufacturing industry for 1860-1891 and 1890-1916 are united into a single curve for the entire period, using the year 1860 as the base. Second, comparison is made of the curve of relative full time earnings thus constructed with a similar curve of relative wholesale prices of commodities in general, to reveal the movement of real, in addition to and in comparison with that of money, wages. Finally, comparison is made between the movements of piece rates and of full time earnings, to secure some suggestion as to the effects of technical developments upon wage conditions. It should be clearly understood with respect to the last mentioned topic that there is here presented only a sugges-

1. Senate Committee on Finance, *Report on Wholesale Prices, on Wages, and on Transportation*. Senate Reports, 52d Congress, 2d Session. Report 1394, pts. 1-4.

tion regarding possible interpretaions of the statistical evidence available. It is to be hoped that this topic may sometime be investigated by someone who not only has ready and constant access to the necessary sources of information, that is, to the strictly private records of the cotton mills, but is also thoroughly familiar by reason of long experience with the complicated technique of the industry.

There has been no attempt made here to study, with a thoroughness exceeding that already applied by students of economic and industrial history, the history of the labor supply in the New England cotton industry. Obviously the supply has two fundamental aspects, quantity and quality. As regards the former, the compilation and analysis of population and occupation statistics could add little of value for present purposes, since, as we have seen in the recent war period, within limits of very general principles of social and industrial stratification there is no such thing as an arbitrary or permanent division of the industrial population into non-interchangeable classes, and munitions factories have drawn heavily on textile mills for a labor supply. Quantitative changes of population, from a positive point of view, have not been the chief factor in industrial adjustments, and to compile elaborate figures showing such changes would add little to the value of this study.

In general, this quantitative change of labor supply has been a growth from about 122,000 cotton mill employees in the United States in 1860, to 378,000 in the United States in 1910, of whom 189,700 were in New England. Within the New England group of states Massachusetts has always been in the lead, showing a growth of from 38,500 in 1860 to 108,900 in 1910. These are United States Census figures. More detailed figures for Massachusetts are presented in Chapter V. Following Massachusetts in the order of numerical importance, the other New England states are Rhode Island, New Hampshire, Maine and Connecticut. The development of the industry in Vermont is so small as to be almost negligible.

The second aspect of the labor supply is the qualitative one. In this connection it is assumed that the reader is familiar with

the fundamental facts: First, the increasing resort by manufacturers, willingly or unwillingly, to individuals representing the successive waves of European immigration into the United States; second, the fact that the above mentioned change has been combined with the constant improvement of machinery and processes to make relatively more economical the employment of certain immigrant males in place of former female employees, particularly in those departments in which the physical severity of the work to be performed has increased as machinery has increased in size and weight; and third, the fact of relatively decreasing employment of children due chiefly to restrictive legislation by the states, in which matter Massachusetts has consistently been in the lead of the other New England states. If the reader is unfamiliar with these facts let him consult, for information relating to the cotton manufacturing industry, Professor M. T. Copeland's volume descriptive of the American cotton manufacturing industry.[1]

Another point of omission in this study is the detailed consideration of problems connected with the technique of the textile manufacturing processes. Most readers will be sufficiently familiar with the fundamental textile processes to follow intelligently the work of statistical compilation and analysis in the succeeding chapters. To any who wish more detailed information than is here assumed, there is recommended the reading of Chapters IV and V of Professor Copeland's book above referred to, or of the descriptive materials of Bulletin 239 of the Bureau of Labor Statistics.[2]

So far as we are concerned in this study with the technicalities of the occupational division of labor, the fact of chief interest relates to the influence of manufacturing technique upon the conditions of collective bargaining and upon the significance of statistical data covering the matter of piece rates.

It is a fundamental prerequisite of successful collective bargaining concerning wages that there be some considerable

1. Copeland, M. T., *The Cotton Manufacturing Industry of the United States.*

2. United States Bureau of Labor Statistics, Bulletin 239. *Wages and Hours of Labor in Cotton Goods Manufacturing and Finishing*, 1916. Pp. 140-205.

degree of standardization of working conditions or of working rules. And it is a regrettable weakness in the American cotton manufacturing industry that no such standardization has as yet been attained. In the British cotton manufacturing industry there has gradually been developed a set of standardized wage scales, that is scales of compensation in the piece working crafts which adjust themselves automatically to changed conditions of production or to changes of products. For this reason most English weavers are protected somewhat against the risk of accidental or intentional reductions of earnings caused by incorrect readjustment of piece rates as the width of the cloth, the fineness of the warp and weft threads, the number of threads per square inch, and the speed of operation of the machine are changed. Notwithstanding intermittent agitation for the construction of similar standard lists in the United States, particularly in New Bedford, the leading center of the American fine goods industry, where such standardization is most needed, it has not been possible to secure agreement thereon. In fact, opposition of employers has gone so far that it has not been possible to secure for the Massachusetts laws requiring the attachment to all weaving work of cards of detailed specifications an amendment to the effect that these specifications be not written or printed in a code necessarily unintelligible to the workers. Under such conditions collective bargaining whether by individual unions or by groups of unions can not attain a very high degree of development. The nearest approach to a real standard list of piece rates in the New England cotton industry is the mule spinners' list at Fall River, agreed to by the union of mule spinners and the local manufacturers in 1889.

From the standpoint of the statistician the absence of highly standardized conditions in the matter just discussed is of prime interest in that it partially explains the lack of close correlation between the movement of piece rates and that of full time earnings.

Regarding union organization of cotton mill employees something is said in Chapter II in connection with the sliding

scale experiments at Fall River. In general, the New England textile industry is one in which craft organization has never been very strong, a fact due largely to the low degree of skill required of the majority of the workers and to the presence of large groups of immigrants of many nationalities. In recent years there has been developing considerable antagonism between the old craft unions and the industrial organizations which lean toward the philosophy and the policy of the Industrial Workers of the World.

The character of the work done in the preparation of the succeeding chapters and the manner of presentation of results render superfluous the publication of a formal bibliography. For the purely statistical work the chief sources have been the so-called Weeks Report of the Tenth Census,[1] the Aldrich Report of 1893, Professor Wesley C. Mitchell's excellent volume on *Gold, Prices, and Wages under the Greenback Standard*, the Annual Reports and Bulletins of the United States Bureau of Labor and of its successor, the Bureau of Labor Statistics, and the reports of the Massachusetts Bureau of Statistics, particularly the Reports on the Statistics of Manufactures. Throughout the following pages care has been taken to give specific references to these sources and to explain as clearly as possible the modifications and rearrangements of materials made for the purpose in hand.

Frequent specific references are made in the text and in footnotes to contemporary accounts in commercial and financial journals descriptive of industrial conditions, and there are also frequent references to books and pamphlets. It is needless to present a general bibliography of useful materials in view of the existence in print of a very complete and well arranged bibliography covering the whole subject of the manufacture of cotton goods.[2] There is also an excellent select bibliography in the

1. Weeks, Joseph D., *Report on the Statistics of Wages in Manufacturing Industries*. Tenth Census of the United States, Vol. XX. The cotton manufacturing industry is covered in pp. 327-367.

2. Woodbury, C. J. H., *Bibliography of the Cotton Manufacture*. 2 vols. (1909 and 1910). Published by The National Association of Cotton Manufacturers of which Mr. Woodbury was then secretary.

appendix of Professor Copeland's book. The reader may be interested, for purposes of comparison, in a study somewhat similar to the present, but covering the British section of the cotton manufacturing industry, by Mr. G. H. Wood of the Royal Statistical Society.[1]

To make specific reference to all who have given assistance in the preparation of this monograph would be impracticable. The author wishes, however, to acknowledge his indebtedness to Professors F. A. Fetter and E. W. Kemmerer of the Department of Economics and Social Institutions of Princeton University and to Mr. W. M. Adriance, formerly of that department, for advice and assistance in the preparation of the manuscript, and to Mr. A. F. Bemis of the National Council of American Cotton Manufacturers, for co-operation in securing publication at this time.

1. Wood, George Henry, *The Statistics of Wages in the United Kingdom during the Nineteenth Century*. Parts XV-XIX. *The Cotton Industry*. Journal of the Royal Statistical Society, 1910, pp. 39-58, 128-163, 283-315, 411-434, 585-626.

CHAPTER II

Changes of Rates of Wages at Fall River [1]

In an industry like that of cotton cloth manufacturing, organized to a large degree upon the principle of the division of labor, and in which there is a great diversity of products and of technical conditions of operation from town to town, from mill to mill, and from one mill department to the next, the study of the movement of rates of wages is at best difficult. In the American cotton manufacturing industry changes in technical processes, equipment and products have been rapid, the operative force has been continually changing as regards its racial composition, union organization and arrangements for collective bargaining, except in special cases, have been weak and somewhat temporary, and there has consequently not evolved any very considerable standardization of rates of wages. The result is that materials for the study of movements of rates of wages are limited.

However, at Fall River, Massachusetts, the leading cotton manufacturing city of the United States, collective bargaining has attained some strength, the representatives of the chief craft organizations[2] being organized into a Textile Council, which deals on behalf of all the operatives, so far as occupational classification is concerned, with the Cotton Manufacturers' Association of the city.[3] The latter organization represents and

1. This chapter is based upon an article by the author under the title *The Fall River Sliding Scale Experiment of 1905-1910*, appearing in the American Economic Review, Vol. VII, No. 3, pp. 530-552 (September, 1917). The materials there used have been revised and extended. Due acknowledgment is made to the editors of the American Economic Review for permission to use them in the present larger work.

2. The unions of mule spinners, weavers, slasher tenders, carders and loom fixers.

3. Formed April 19, 1873, as the Manufacturers' Board of Trade. The name was changed to its present form October 27, 1890. Collective bargaining was first participated in on January 30, 1875, when the association dealt with a committee of weavers. The present Textile Council is first mentioned in the Association's records on February 20, 1899.

acts for nearly all the mills in Fall River. While one or two mills, notably the Fall River Iron Works, insist upon dealing with their own employees upon an independent basis, the wage policies of these establishments are not widely at variance with those of the Association.

A second condition favorable to the purposes of the present investigation is the fact that Fall River is the center of the plain rather than of the fine goods manufacture, so that the absence of a high degree of standardization of rates as between mills and departments constitutes a difficulty of diminished significance. That is, since products are less diversified than elsewhere there is greater probability of changes of rates of wages being applied impartially to all employees regardless of the technical conditions of their work.

Third, it happens that there is public record of the weaving rates paid at Fall River for a cut of 45 yards of 28 inch 64x64 print cloth, going back as far as 1875. This particular piece rate has been used for years as the basis for discussion of wage advances and reductions. Changes of rates of wages are commonly expressed by percentage figures. The understanding has been that whatever rate per cent. of change occurs in the weaving rate shall apply to all workers in all departments of the mills coming under the collective agreements.[1] And to know the actual weaving rates applying to a particular mill product is of immense advantage, for thereby there is eliminated much probability of misunderstanding as to the bases used in calculating given wage changes.[2]

Finally, it should be noted that changes of wages at Fall River are generally regarded as indicative of changing condi-

1. On one occasion, that of a general strike at Fall River in 1894, the mule spinners received an advance of 5 per cent., although none of the other operatives received any advance. This was an exceptional case.

2. For example, if a piece rate is advanced on January 1 of any year from 20 cents to 21 cents, there is an advance of 5 per cent. Concerning this there is no difficulty. Suppose, however, that at the end of three months the piece rate drops to 20 cents. The reduction is approximately 4.76 per cent. But such accuracy of expression is rarely found in available records. Rather the popular view is that both the advance and the reduction were at the rate of 5 per cent.

tions throughout the New England cotton industry. This statement does not mean that Fall River always leads New England in making changes of wages. In 1912, for example, Fall River and other Massachusetts mill cities adopted a policy of watchful waiting, and at the conclusion of the Lawrence strike changes of wages were made in accord with the results attained at Lawrence. But from a historical point of view changes at Fall River are without doubt the most accurate available index of wage changes throughout the mills of New England.[1]

Table I and Chart I present the chief facts relative to the changes of the standard weaving rate at Fall River since 1875.[2]

1. Cf. also a statement (much more emphatic than this) made by a Fall River manufacturer, quoted in the Textile Manufacturers' Review and Industrial Record, April 27, 1895, pp. 10, 11.

2. The weaving rates actually in force have been taken from (1) a table given by Mr. J. T. Lincoln on pages 461, 462, of an article, *The Sliding Scale of Wages in the Cotton Industry*, Quarterly Journal of Economics, Vol. XXIII, pp. 450-469; (2) a table of rates presented on page 22 of the Member's Contribution Book of the Card and Picker Room Protective Association of Fall River and Vicinity; and (3) tables published from time to time in the New York Commercial and Financial Chronicle in the annual report on cotton and cotton manufacture, e. g., August 31, 1918, p. 869. This annual report is published usually late in August or early in September.

The weighted average weaving rate prevailing each year was found by weighting each rate prevailing at any time during the year by the number of weeks the rate was actually in force; e. g., in 1899 the weavers worked 8 weeks at a piece rate of 16 cents, 41 weeks at 18 cents, and 3 weeks at 19.80 cents. The weighted average rate for 1899 is therefore 17.80 cents. On account of ignorance of the exact dates of the changes of rates of wages in 1875, 1876, 1878 and 1880, figures for these years have not been computed for insertion in columns 5 and 6.

The price data are from Professor M. T. Copeland's *The Cotton Manufacturing Industry of the United States*, Appendix, p. 393, supplemented by figures from the Statistical Abstract of the United States (from which Professor Copeland's figures were evidently taken).

The figures representing the annual average margins of profits for the years 1880-1910, are from Professor Copeland's book. The margins for the years 1875-1879 and 1911-1917 have been computed by the present writer. The "margin of profit" which was involved in the sliding scale agreements of 1905-1906 and 1907-1910 and which was considered by Governor Douglas in the arbitration of the dispute of 1904-1905 was a margin of profit per unit of product—the differential between the cost of a certain amount of raw cotton and the price of the cloth into which the raw material was converted. The exact method of computation under both agreements and as used in the construction of Table I may be reduced to the following rules.

Multiply the price of middling upland cotton by 8 (to get the price of 8 pounds); multiply the selling price per yard of 28-inch 64x64 print cloth by 45 (the number of yards in a cut); multiply the selling price per yard of 38½ inch 64x64 print cloth by 33.11 (the number of yards in a cut); add these last two products; divide by 2; deduct the price of the 8 pounds of middling upland cotton.

For example, using the data for 1881:	Cents.
45 yards 28″ 64x64 print cloth at 3.95 cts. =	177.75
33.11 yards 38½ 64x54 print cloth at 7 cts. =	231.77
Sum =	409.52
Divide by 2 =	204.76
8 pounds middling upland cotton at 12.03 cts. =	96.24
Margin of profit =	108.52

In the fourth, sixth and eleventh columns the actual weaving rates in force, the weighted average weaving rates, and the annual average margins of profit are converted into series of index numbers, using the figures for 1881 as the base (100). This base was selected because (1) seemed desirable, in the case of the weaving rates, to use as a base a rate that was actually paid at some time rather than an average of any series of rates; (2) the weaving rate of 21 cents prevailed for a longer continuous period than any other rate in the early part of the period under study; (3) the exact date when the weaving rate of 21 cents reported for 1880 became operative is not known to the writer, and therefore it has not been possible to find the weighted average rate prevailing in 1880; and (4) it seemed advisable not to go back into the greenback period for the selection of a base.

Chart I presents for the entire period 1875-1918 curves showing the movements of actual weaving rates and of annual average margins. In this chart the scale at the left measures the movement of wages, while that at the right measures the movement of margins.

In Table I and Chart I, 18.63 cents per cut (the average rate under the first sliding scale agreement) is used as the rate prevailing from October, 1905 to July, 1906.

TABLE I

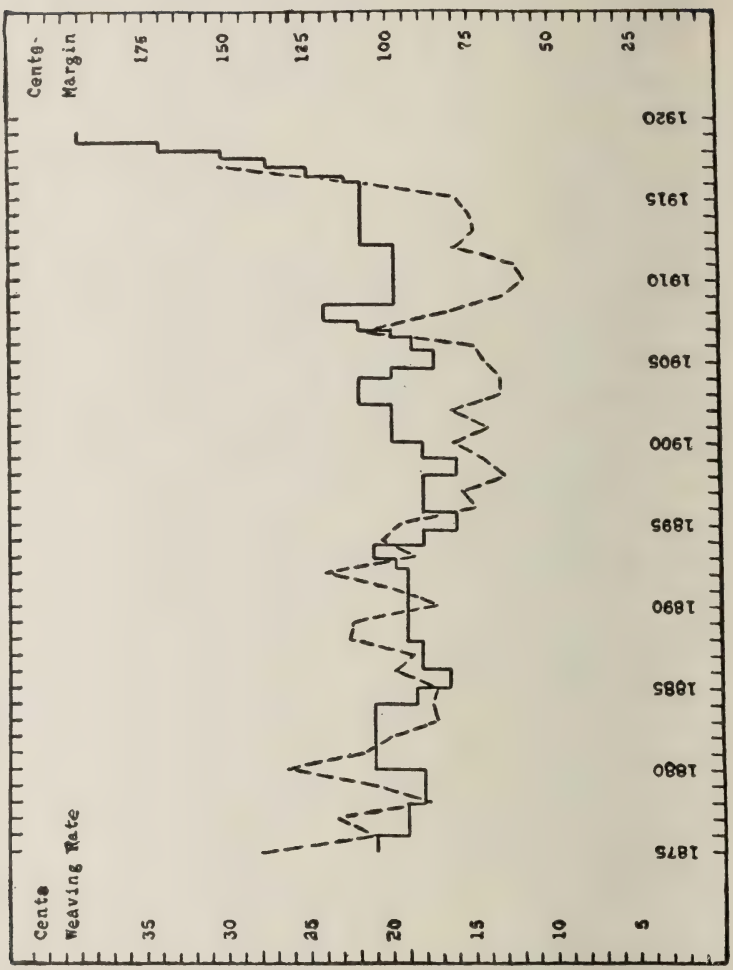
Wages, Prices, and Margins at Fall River, 1875–1918

Changes of Wages.				Annual averages of wages, prices and margins.						
1 Years	2 Exact Dates.	3 New weaving rates in force.	4 Index numbers of weaving rates Base (100) =21.00 cents	5 Weaving rates	6 Index numbers of weaving rates Base (100) =21.00 cents.	7 Middling upland cotton per pound.	8 28 inch print cloth per yard	9 38½ inch print cloth per yard.	10 Margins.	11 Index numbers of margins Base (100) =108.52 cents.
		(Cents)		(Cents)		(Cents)	(Cents)	(Cents)	(Cents)	
1875		21.00	100.00			15.46	5.33	8.71	140.43	129.40
1876		19.00	90.48			12.98	4.10	7.06	105.28	97.00
1877						11.82	4.38	6.77	116.05	106.93
1878		18.00	85.72			11.22	3.44	6.09	88.45	81.50
1879						10.84	3.93	6.25	105.17	96.90
1880		21.00	100.00			11.51	4.51	7.41	132.07	121.70
1881			100.00	21.00	100.00	12.03	3.95	7.00	108.52	100.00
1882				21.00	100.00	11.56	3.76	6.50	99.73	91.90
1883				21.00	100.00	11.88	3.60	6.00	85.79	79.06
1884	Feb. 4	18.50	88.10	18.71	89.10	10.88	3.36	6.00	87.89	80.99
1885	Jan. 19	16.50	78.58	16.78	79.91	10.45	3.12	6.00	85.93	79.18
1886	Mar. 1	18.15	86.44	17.89	85.20	9.28	3.31	6.00	97.57	89.90
1887				18.15	86.44	10.21	3.33	6.00	92.58	85.31
1888	Feb. 13	19.00	90.48	18.90	90.00	10.03	3.81	6.50	113.09	104.20
1889				19.00	90.48	10.65	3.81	6.50	108.14	99.64
1890				19.00	90.48	11.07	3.34	6.00	85.92	79.17
1891				19.00	90.48	8.60	2.95	6.00	96.90	89.29
1892	July 11	19.60	93.34	19.39	92.34	7.71	3.39	6.25	118.10	108.83
	Dec. 5	21.00	100.00							
1893	Sept. 11	18.00	85.72	20.03	95.38	8.56	3.30	5.25	92.69	85.41
1894	Aug. 30	16.00	76.20	17.34	82.58	6.94	2.75	4.90	102.47	94.42
1895	Apr. 22	18.00	85.72	17.38	82.76	7.44	2.86	5.25	96.74	89.14
1896				18.00	85.72	7.93	2.60	4.66	74.21	68.39
1897				18.00	85.72	7.00	2.48	4.70	77.61	71.52
1898	Jan. 1	16.00	76.20	16.00	76.20	5.94	2.06	3.96	64.90	59.80
1899	Feb. 27	18.00	85.72	17.79	84.72	6.88	2.69	4.25	70.84	65.28
	Dec. 11	19.80	94.28							
1900				19.80	94.28	9.25	3.21	5.00	81.00	74.64
1901				19.80	94.28	8.75	2.84	4.62	70.38	64.86
1902	Mar. 17	21.78	103.72	21.36	101.72	9.00	3.11	5.00	80.75	74.41
1903	Nov. 23	19.80	94.28	21.55	102.63	11.18	3.25	5.00	66.46	61.24
1904	July 25	17.32	82.48	18.55	88.34	11.75	3.44	5.00	66.18	60.98
1905	Oct. 30	18.63	88.62	17.54	83.52	9.80	3.13	4.75	70.66	65.12
1906	July 2	19.80	94.28	19.39	92.34	11.50	3.63	5.12	74.44	68.60
	Nov. 26	21.78	103.72							
1907	May 27	23.96	114.11	23.08	109.92	12.10	4.62	6.00	106.48	98.12
1908	May 26	19.66	93.62	21.39	101.86	10.62	3.50	5.37	82.69	76.20
1909				19.66	93.62	12.68	3.67	5.06	64.90	59.80
1910				19.66	93.62	15.11	3.87	5.62	59.24	54.59
1911				19.66	93.62	13.01	3.54	5.24	62.32	57.42
1912	Mar. 25	21.62	102.96	21.16	100.76	11.52	3.82	5.22	80.21	73.91
1913				21.62	102.96	12.80	3.86	5.40	73.85	68.05
1914				21.62	102.96	11.13	3.48	5.19	75.18	69.27
1915				21.62	102.96	10.14	3.27	5.19	78.38	72.22
1916	Jan. 24	22.71	108.15	24.36	116.00	14.45	4.60	7.20	107.10	98.68
	May 1	24.98	118.97							
	Dec. 4	27.48	130.86							
1917	June 4	30.23	143.96	29.36	139.82	23.49	7.18	10.79	152.26	140.28
	Dec. 3	34.02	162.00							
1918	June 3	39.12	186.30	36.96	176.00					

CHART I

Weaving Rates and Margins at Fall River, 1875–1919
(Actual rates and annual average margins)

——— Weaving rates
- - - - - - - - - - - - Margins



The period studied in this chapter falls into three divisions; first, the period from 1875 to October 30, 1905; second, the period from October 30, 1905 to May 30, 1910; third, the period from May 30, 1910 to the date of completion of the present monograph. The first and third periods enumerated above do not differ from each other in essentials, except so far as a portion of the third period has been characterized by war conditions. During these two periods wages in the Fall River cotton manufacturing industry have been determined by the operation of competitive forces. In the second period, however, there occurred a most interesting experiment in wage determination by the method of the sliding scale. It is in connection with this experiment that the facts concerning changes of rates of wages in the earlier and later periods have their chief interest.

Inspection of column 3 of Table I and of the solid line on Chart I shows that in the thirty years preceding the sliding scale agreements changes of rates of wages, although quite frequent, kept within a relatively narrow range. The initial rate in the series, 21 cents per cut, in 1875, was also the highest rate during this thirty year period with the single exception of the rate of 21.78 cents per cut paid between March 17, 1902 and November 23, 1903. The lowest rate in force at any time in this first period was 16 cents (from August 30, 1894 to April 22, 1895, and from January 1, 1898 to February 27, 1899). These two short periods of extreme depression of the rates reflect respectively the general industrial depression succeeding the panic of 1893 and the more local depression exhibited by the New England section of the American cotton industry due to the keenness of developing competition by the southern mills. During this early thirty year period there appears no one consistent or clearly defined upward or downward movement of the rates. There can not be traced clearly a direct reflection of the course of general commodity prices downward until 1896, although there is some suggestion of the upward swing of industrial prosperity since that date. Supposedly the fluctuations of the piece rate, nearly a score in number, were in the

main due to conditions peculiar to the cotton munufacturing industry. That a relationship exists between rates of wages and conditions in the markets for cotton and cotton cloth early found lodgment in the minds of both employers and employees, particularly the former, familiar as they were with the accounting aspects of the wage problem. And the particular formulation of the relationship was that wages at Fall River have fluctuated with the "margin of profit"—that is, the margin between the cost of raw cotton entering into certain grades of goods and the selling prices of these goods. The margin came to be looked upon as an index of the prosperity and wage-paying ability of the industry, and was the basis for the sliding scale arrangement made following the strike of 1904.

On July 14, 1904, after a period in which conditions in the industry had been unsatisfactory both to the employers and to the employees, during which period unemployment had been abnormally large and wages in the Fall River mills had been reduced about 10 per cent. (in November, 1903), it was announced in the mills represented in the Cotton Manufacturers' Association that on July 25 there would be a further reduction of 12½ per cent. As a result there occurred what is known in the industry as the "great strike of 1904." For nearly six months the Fall River cotton industry was at a standstill. Finally work was resumed on January 18, 1905, on the basis of an agreement "that Governor Douglas should investigate the matter of margins between the cost of cotton to the mill owners and the selling price of cloth, and submit his conclusions as to an average margin, upon which the manufacturers should pay a dividend of 5 per cent. on the wages earned from January 18 to April 1."[1]

On May 17, Governor Douglas reported that a margin of 74.38 cents was necessary to justify a wage "dividend" of 5

1. Commercial and Financial Chronicle, September 9, 1905, p. 808. See also Textile World Record, Vol. XXIX, p. 593, and the Massachusetts Board of Conciliation and Arbitration, Annual Report, January, 1906, pp. 20-22. The last mentioned source gives Governor Douglas' full report. For an explanation of the method ordinarily used in computing the margin of profit, see the note accompanying Table I and Chart I. Governor Douglas used only one set of cloth prices in estimating the margin.

per cent. The margin on January 18 had been 67.80 cents, and had steadily grown smaller. The reduction of the weaving rate to 17.32 cents per cut was therefore accepted by the operatives, with the understanding that with the improvement of trade the mills would move wages up toward the level at which they had stood before the reduction of November, 1903.

On October 17, 1905, the Manufacturers' Association made to the operatives in the mills included in the organization a proposition as follows.[1] Beginning October 23 wages should be increased about 5 per cent. In addition, a sliding scale agreement should be made, according to which, whenever the employers' margin of profit (to be figured as the difference between the price of raw cotton and that of regular print cloth) should exceed 75 cents, there should be a wage dividend or premium of 1 per cent. for each cent the margin stood above 75 cents up to a margin of 85 cents; and that for each cent the margin should exceed 85 cents up to a maximum of 95 cents there should be an additional wage premium of one-half of 1 per cent. Calculations of margins and of wages should be made at the end of four-week periods, and the wage premiums should be given to employees of at least two weeks' standing.

Immediately following this proposal of the Manufacturers' Association, the Fall River Iron Works announced an advance of about 14 per cent. on the rates of wages prevailing before January 23, 1905.[2] Dissatisfaction among the employees of the other mills caused by this move gave rise to talk of a strike to secure similar concessions from the Manufacturers' Association.[3] This, however, was soon quieted, the Textile Council coming to an agreement with the employers on October 25.

The arrangements then made embraced the same scale of graduated rates suggested in the employers' proposal of October 17, except that 72.5 cents rather than 75 cents was agreed upon as the base margin for a wage of 18 cents per cut for weaving regular print cloth. The base rate of 18 cents was to be the

1. Chronicle, October 21, 1905, p. 1268.
2. Ibid., pp. 1268, 1269.
3. Ibid,, October 28, 1905, p. 1329.

minimum rate. The proposed maximum margin of 95 cents beyond which the wage should not slide was excluded from the agreement. And in place of calculations of average margins and wages at intervals of four weeks, provision was made for weekly changes of rates. In the calculation of the margin, two grades of cloth (28-inch and 38½-inch 64 x 64 prints) were to be considered. It was tacitly agreed that the sliding scale should be given a fair trial for one year.[1] The following schedule of hypothetical margins and weaving rates under the agreement of October, 1905, may help the reader to visualize the plan of wage determination and to make comparison with later schedules.

TABLE II

Hypothetical Margins and Weaving Rates to Illustrate the Sliding Scale Agreement of October, 1905

Margins.	Weaving Rates.	Margins.	Weaving Rates.
(Cents)	(Cents)	(Cents)	(Cents)
115	22.95	85	20.25
110	22.50	80	19.35
105	22.05	75	18.45
95	21.15	72.5	18.00

This first formal sliding scale experiment was of short duration. For this there were two chief reasons. First, under this agreement, the average weaving rate in force was only 18.63 cents per cut of regular print cloth; which constituted an average "wage premium" of only 3.5 per cent., or only about one-half of the desired restoration of wages to the level prevailing between November, 1903 and July, 1904. Second, the rates of wages paid fluctuated so violently from week to week (see Table III) that the operatives became much dissatisfied and

1. Some sources for the terms of this agreement are: Chronicle, November 4, 1905, p, 1385; Lincoln, loc. cit., p. 456; Massachusetts Labor Bulletin, No. 38, p. 342, No. 41, pp. 192-196; Textile World Record, vol. XXX, pp. 361-363.

were led to question the validity of the theoretical foundation of the experiment.[1]

TABLE III [2]

Actual Margins and Rates under the Sliding Scale Agreement of October, 1905

Week Ended.	Margins.	Wage Premiums.	Weaving Rates.	Week Ended.	Margins.	Wage Premiums.	Weaving Rates.
1905	(Cents)	(Per Cent.)	(Cents)	1906	(Cents)	(Per Cent.)	(Cents)
Oct. 27	77.00	5	18.90	Mar. 3	82.85	10	19.80
Nov. 3	75.70	3	18.54	" 10	80.19	8	19.44
" 10	71.40	0	18.00	" 17	81.27	9	19.62
" 17	74.00	2	18.36	" 24	77.82	5	18.90
" 24	73.50	1	18.18	" 31	75.42	3	18.54
Dec. 1	75.20	3	18.54	Apr. 7	76.15	4	18.72
" 8	72.40	0	18.00	" 14	75.02	3	18.54
" 15	75.02	3	18.54	" 21	74.82	2	18.36
" 22	73.76	1	18.18	" 28	75.55	3	18.54
" 29	75.37	3	18.54	May 5	72.85	0	18.00
1906				" 12	71.40	0	18.00
Jan. 5	76.41	4	18.72	" 19	70.68	0	18.00
" 12	78.09	6	19.08	" 26	71.14	0	18.00
" 19	75.23	3	18.54	June 2	73.28	0	18.00
" 26	75.56	3	18.54	" 9	75.56	3	18.54
Feb. 2	79.49	7	19.26	" 16	76.67	4	18.72
" 9	81.16	9	19.62	" 23	71.17	0	18.00
" 16	81.45	9	19.62	" 30	71.16	0	18.00
" 23	82.75	10	19.80				

Dissatisfaction caused by these conditions was intensified when, in May, 1906, voluntary wage advances of 10 per cent. were made by certain corporations in Massachusetts and Connecticut engaged in the manufacture of fine goods.[3] Although the employers in Fall River were insistent that "increases in fine goods mills, where margins of profits were large, should have no bearing on the general situation in Fall River,"[4] the

1. For an elaboration of this point see Lincoln, loc. cit., pp. 456-459.

2. This table is constructed on the basis of the table presented by Mr. Lincoln on page 457 of his article. Computations for June, 1906 have been added; also weaving rates for the entire period.

3. Chronicle, June 23, 1906, pp. 1405, 1406.

4. Ibid., September 8, 1906, p. 531.

Textile Council, voicing the feeling of the operatives with regard to the sliding scale, strongly urged the abandonment of the experiment and the restoration of the rates of wages prevailing before July, 1904. This request was made on June 8. On the sixteenth of the same month the Manufacturers' Association made a counter proposal, offering to guarantee a wage premium (on the basis of the sliding scale) of 5 per cent. from June 12 to October 1 "with a further guarantee that if the margin in any one week exceeded this 5 per cent. increase they would pay the additional amount."[1] When this plan was rejected the manufacturers yielded, promising to restore the rates desired (*i.e.*, rates based on a weaving rate of 19.80 cents), at the same time protesting that the margin of profit warranted no such advance and claiming that the advance was made only in the interest of the general welfare of the city.[2] The new schedule became effective July 2, 1906.

The weaving rate of 19.80 cents per cut thus established remained in force only a few months. A widening margin of profit and a demand for goods so large that, in view of a reported scarcity of labor, it could not be satisfied,[3] soon led to renewed demands for wage advances. This time the request was for a restoration of the rates prevailing before the reduction of 1903. After some parleying, a counter proposal by the employers of a compromise of 5 per cent. increase (with the promise of 5 per cent. more in February, 1907, if conditions should be favorable),[4] and a threat of strike on the part of the employees, the manufacturers yielded, and a rate of 21.78 cents was announced to take effect November 26. The margin at this time was about 95 cents.[5] And it was a part of the settlement then made that the wage determined upon should be

1. Chronicle, June 23, 1906, p. 1406.

2. Ibid., p. 1448. Following the action of the Manufacturers' Association, the Fall River Iron Works increased the wages of its operatives 10 per cent., "giving them that advantage over the help in other mills of the city." Chronicle, September 8, 1906, page 531.

3. Ibid., January 5, 1907, p. 60. Mr. Lincoln in his article (p. 459) says that the prosperity of the industry at this time was "greater than ever before known."

4. Chronicle, November 24, 1906, p. 1302.

5. Ibid., May 11, 1907, p. 1129.

effective for six months, at the end of which period there should be a readjustment with reference to the then existing margin.[1]

Accordingly, near the end of April, 1907, discussion of the wage problem was reopened. The margin of profit was found to have widened quite substantially, and the advantages which might have accrued to the operatives had they not insisted upon abandonment of the sliding scale appeared great. The demand of the operatives was for a 10 per cent. advance. This the employers were disposed to refuse, but finally the advance was granted with a sliding scale agreement attached.

In brief the provisions of this agreement were as follows:[2] Eighteen cents per cut was established as the minimum weaving rate for 28-inch prints at a base margin of 72.5 cents. At a margin of 75 cents the weaving rate should be 18.68 cents, and above the margin of 75 cents rates were graded in accord with the margin changes indicated in the following tabulation until a maximum margin of 115 cents was reached at which the maximum weaving rate should be 23.96 cents. The scale of progression was slightly steeper than that provided in the agreement of 1905.

TABLE IV

Schedule of Margins and Weaving Rates Provided by the Sliding Scale Agreement of May 14, 1907

Margins.	Weaving Rates.	Margins.	Weaving Rates.
(Cents)	(Cents)	(Cents)	(Cents)
115	23.96	85	20.69
110	23.42	80	19.66
105	22.87	75	18.68
95	21.78	72.5	18.00

Second, the agreement provided that rates of wages should

1. Ibid., September 7, 1907, p. 564.
2. The full text of this agreement is presented in the Appendix.

change only once in six months, calculations being made on the last Monday of May and November of each year, the rate to be effective in each six-month period being determined by the average margin of the preceding six months. And, quoting from section 2 of the agreement, "there shall be no change in prices on either the ascending or descending scale unless the margin has reached a point indicated in the . . . . schedule."

The new agreement went into force with a weaving rate of 23.96 cents, the highest rate allowed under the terms of the bargain, and also the highest rate which had up to that time been paid in the Falls River mills. But the extremely high margins of 1907 were of short duration, and 1908, 1909 and 1910 witnessed successive downward movements. Not only was this true, but, in 1907, difficulties in the financial world found their way into the cotton industry, with the result that curtailment of production was considered and well under way before the end of the year.[1] Corporations supposed to be filling large orders were unable to secure ready money for use in purchasing materials and in meeting payroll demands, as jobbers were embarrassed by very high interest rates in making payments on deliveries of goods.[2] Through the spring of 1908 curtailment in the form of a short working week was still general.[3] At points throughout New England other than Fall River reductions in wages were the order of the day. But at Fall River the sliding scale agreement for a time saved the operatives from this form of hardship. When, near the end of May, calculations of margins and of wages were made, they showed that the financial distresses had been accompanied by a marked decline of the margin (which in April and May had been between 50 and 60 cents) and that, in accordance with the agreement, the weaving rate must drop from 23.96 cents per

1. For interesting information regarding the method adopted by the mill men throughout New England to secure uniformity of curtailmeut see the Chronicle of November 16, 1907, p. 1237; November 23, 1907, p. 1301; December 28, 1907, p. 1653.

2. Chronicle, November 23, 1907, p. 1301.

3. Ibid., March 14, 1908, p. 631; March 28, 1908, pp. 757, 758; May 23, 1908, p. 1293; May 30, 1908, p. 1308.

cut to 19.66 cents — a reduction of 17.95 per cent. The spirit in which this, the largest single reduction of wages experienced by Fall River workers was accepted, deserves only the highest commendation.[1] The operatives as a whole were as yet unwilling to declare the experiment a failure, although the mule spinners led an attempt to have the agreement abandoned through the required process of three months' notice. Instead of abandonment, revision was resorted to in September, when the scale of margins and wages was graduated somewhat more nicely, the intervals between the margins named in the schedule being made uniform at two and one-half cents as shown in Table V. Another slight change was the provision for a delay of two weeks in the enforcement of new rates of wages at the end of each six-month period.[2]

TABLE V

Schedule of Margins and Weaving Rates Provided by the Revised Sliding Scale Agreement of September 8, 1908

Margins.	Weaving Rates.	Margins.	Weaving Rates.
(Cents)	(Cents)	(Cents)	(Cents)
115	23.96	92.5	21.50
112.5	23.69	90	21.23
110	23.42	87.5	20.96
107.5	23.14	85	20.69
105	22.87	82.5	20.18
102.5	22.59	80	19.66
100	22.32	77.5	19.17
97.5	22.05	75	18.68
95	21.78	72.5	18.00

In November, 1908, calculation of the margin showed another marked decline, according to which the rates of wages, under the automatic operation of the agreement, were to be expected

1. Mr. Lincoln on pages 465, 466, of his article gives in full the statement issued at the time by Mr. James Tansey, then president of the Textile Council. See also Massachusetts Labor Bulletin, No. 60, pp. 263-266.

2. The whole amended agreement is found on pages 16-18 of the handbook of the Carders' Union.

to drop to the minimum of 18 cents. Instead, the manufacturers waived their rights and allowed the existing rates to continue in force. The situation can best be made clear by quotation from the letter of the Manufacturers' Association to the Textile Council under date of November 19, 1908.[1]

> Believing that indications point to a prosperous season, the Manufacturers' Association is inclined to waive for the present occasion its right under the contract to reduce wages and to suggest, if it be agreeable to the Textile Council, that the present rate of wages be maintained for the ensuing period of six months, it being thoroughly understood that the extra wage thus paid is something over and above what is required by the contract, which still remains binding on both parties and is offered as in some way a substantial recognition of the good faith of the operatives in remaining true to their contractual obligations.
>
> If, therefore, the members of the Textile Council approve this suggestion, and thus indicate their understanding that no precedent is hereby established and that the textile agreement still remains in full force, the arrangement outlined above will become effective.

The Commercial and Financial Chronicle gives an additional suggestion of what the conditions were which made this action of the manufacturers possible.[2]

> It is explained [by the manufacturers] that supplies of cotton were secured much below recent quotations; had the manufacturers been forced to buy raw materials and sell products at current quotations, the waiving of the rights would not have been possible.

As is shown in Table VI, the succeeding periods of wage

1. Handbook of the Carders' Union, p. 19. See also Massachusetts Bureau of Statistics, Annual Report, 1909, pp. 44-47; Textile World Record, Vol. XXXVI, pp. 314, 315. The Textile World Record said with reference to the action of the manufacturers: "They do this undoubtedly because they believe that insisting on the reduction would be an injustice. This is the practical recognition of the important fact that the wages of textile mill operatives are below the American wage standard." (Vol. XXXVI, p. 315.)

2. Chronicle, December 11, 1909, p. 1509.

calculation witnessed repetitions of the employers' action of November, 1908. In February, 1910, the operatives, keenly disappointed at the failure of wages to slide upward, voted to withdraw from the agreement. This gave rise to fresh discussion of future rates of wages, and tentative plans were taken up. The proposal of the employees was that of a sliding scale in which 19.66 cents per cut, the rate then being paid, should be the minimum rate, this to be paid at a margin of 67.5 cents or lower. The maximum rate proposed was 26.03 cents at a margin of 115 cents. Such a scale, if adopted, would have meant an advance all along the line of between 8 and 10 per cent. The manufacturers would not agree to such a marked change, being willing to make only a smaller advance on the sliding scale basis. Consequently the sliding scale experiment was abandoned.[1]

TABLE VI

Actual Margins and Wages under the Sliding Scale Agreement of May 14, 1907

(Revised September 8, 1908)

Dates of wage changes.	Average margins for the preceding six-month periods.	Weaving rates for the the succeeding six-month periods.	
		Rates called for by the agreement.	Rates actually in force.
	(Cents)	(Cents)	(Cents)
May 27, 1907	115.60 [2]	23.96	23.96
Nov. 25, 1907	130.89	23.96	23.96
May 26, 1908	79.00	19.66	19.66
Nov. 26, 1908	60.82	18.00	19.66
May 28, 1909	74.01	18.00	19.66
Nov. 29, 1909	66.90	18.00	19.66
May 30, 1910	66.15	18.00	Agreement abandoned

1. Chronicle, September 10, 1910, p. 622.

2. The margin of profit upon which the weaving rate for the six months following May 27, 1907, was based was the average margin for a period slightly shorter than six months, ending April 30, 1907 (Chronicle, May 11, 1907, p. 1129). The other sources of the materials tabulated above are as follows: Lincoln, loc. cit., p. 463; Massachusetts Bureau of Statistics, Annual Report, 1909, pp. 44-47; Massachusetts Labor Bulletin, No. 56, p. 4; No. 60, pp. 263-266; Textile World Record, Vol. XXXVI, pp. 204, 205, 314, 315; Vol. XXXVII, pp. 329, 330; Vol. XXXVIII, pp. 363, 365; Vol. XXXIX, pp. 552, 553.

The first general criticism of the sliding scale experiment is that it did not rest upon an adequate foundation of experience. Analysis of the material presented in Table I and Chart I shows: (1) that in the long period preceding 1905 changes of rates of wages had no consistent relationship to changes in the margin of profit; (2) that there was more accurate adjustment of rates of wages to upward movements of the margin than to downward movements; and (3) that the most important reductions of wages were contemporaneous with business disorders not limited to the cotton manufacturing industry.

In order to secure a more definite expression of whatever relationship may have existed between changes of wages and of market conditions in this industry, Pearson's formula for the coefficient of correlation has been applied to the data of Table I (columns 6 and 11) for the period 1881–1904 inclusive in the manner and with the results indicated in Table VII.

TABLE VII

The Correlation of Wages and Prices at Fall River, 1881–1904

Subject.	Relative.	Allowance for lag.	Co-efficient.	Probable error.
1. Weaving rate	Margin of profit	None	+ .0964	± .1355
2. Weaving rate	Margin of profit	One year	+ .2297	± .1295
3. Weaving rate	Cloth prices [1]	None	+ .4315	± .1114
4. Weaving rate	Cloth prices [1]	One year	+ .3506	± .1200
5. Weaving rate	Raw cotton prices [2]	None	+ .5648	± .0932
6. Weaving rate	Raw cotton prices [2]	One year	+ .3306	± .1218

From Table VII it appears that the correlation between the weaving rate and the margin was smaller than that between the weaving rate and either cotton or cloth prices. This is true even when allowance is made for a lag of one year in the adjustment of wages to changing commodity market conditions. Rather singularly it appears that the coefficient of correlation

1. Averages of the prices of 28-inch and 38½-inch prints.
2. Average annual prices of middling upland cotton.

between weaving rates and raw cotton prices of the same year is the only coefficient of the six greater than +.5 (and if from this coefficient the probable error be subtracted the coefficient falls below the +.5 mark); singularly, because, if one assumes a direct causal relationship between margins and wages, one would expect that the increase of cotton prices would tend to lower wages, not to raise them.

Whatever be the explanation of the relative values of these coefficients, we must conclude that the sliding scale agreements were founded upon no adequate basis of experience; that they cannot be regarded as providing a mechanism to secure without friction the results of the operation of the competitive forces through which wages in this industry had previously been adjusted.

Second, the most elaborate and nicely adjusted system of determination of rates of wages offers no guarantee against unemployment; and we have seen that the Fall River operatives, in their brief experience with the sliding scale, found that curtailment of production by means of short-time operation was still an unsolved problem.

Under unsatisfactory conditions of manufacture the employer has two means of securing relief so far as his relations with his employees are concerned; namely, the reduction of rates of wages, and partial or complete stoppage of production. It is evident that the method of a horizontal reduction of wages, particularly of piece rates, presents to the manufacturer the most direct way of reducing costs per unit of product. On the other hand, the successfulness of an attempt to lower rates of wages when the margin is small and when, from the standpoint of the manufacturer, a direct lowering of the cost per unit seems most to be desired may be limited, even though indefinitely, by the approach of real earnings to the minimum of the workers' standards of living. As to the conditions of trade, these may be such that the method of rate cutting tends to defeat its own purpose. Rate cutting, by decreasing costs, tends to encourage large production. At a time of over-production, when the mills have on hand large stocks of goods unsalable except at low

prices, the obvious remedy is not further manufacture but short-time operation or dismissal of part of the operative force. For a low cost of production in the immediate future cannot remedy the hardships resulting from high cost of goods held in store-houses and not marketable at a profit. On the other hand, the partial suspension of work has the advantage of actually curtailing output and also of being able to be effected with less open opposition on the part of employees.

Systematic and combined curtailment of output, although difficult of successful enforcement, has been sufficiently prevalent in the New England cotton manufacturing industry to have an important bearing upon the soundness of the sliding scale plan. It is of considerable importance that this curtailment and the unemployment resulting therefrom have occurred with no appreciable seasonal regularity. While it is true that the months of July, August and September (when mill stocks are approaching exhaustion and managers are waiting for the marketing of the new crop of cotton) are the months which most frequently show unemployment in excess of the average for the year, it is true that this seasonal swing is very slight. Unemployment that occurs irregularly offers greater difficulties to be overcome in wage agreements than that which is regularly recurring.

It appears from examination of the materials relating to the history of unemployment in the Massachusetts cotton manufacturing industry, presented elsewhere in this monograph,[1] that in the period of thirty-one years from 1886 to 1916 inclusive there were 10 years (1886, 1888, 1893, 1894, 1896, 1897, 1898, 1903, 1904 and 1908) in which the number of cotton textile operatives reported to have been unemployed at some time during the year constituted at least 10 per cent. of the average number of employees for the year. Of these ten years, two (1886 and 1888) were years in which this unemployment existed while wage advances were being made at Fall River. In two other of these ten years (1896 and 1897) rates of wages at Fall River were unchangad. While in the remaining six

1. Chapter V.

years (1893, 1894, 1898, 1903, 1904, and 1908) unemployment existed in the face of very substantial wage reductions. In other words, in these six years wage reductions were supplemented either by part-time operation or by temporary dismissal of a part of the operative force. With the particular form of curtailment we are not here concerned except to note that at Fall River the tendency has been for the manufacturers to act collectively, to run on part time, and thus to retain the advantages of the existing factory organizations of the operative force.

In an industry in which such conditions as these prevail it cannot be ignored that a sliding scale plan may be ever so finely elaborated solely with reference to rates of wages and still offer no guarantee that the wages thus determined shall actually be paid; for the sliding scale does not assure employment. It merely provides that if there is employment to be had, compensation shall be on a prearranged plan. If, however, the sliding scale system does sometimes tend to reduce unemployment by bringing about almost frictionless reduction of wages, then it devolves upon the laborer to weigh for himself the alternatives of steady work at low pay or more fluctuating employment at a higher rate of compensation per piece or per hour.

Third, the so-called margin of profit is not adequate to indicate the wage-paying ability of an industry, assuming that the true unit margin of profit can be ascertained and that no difficulty exists to hinder or prevent the collection and utilization of price information in computing this margin.

The philosophy of the sliding scale appears to be this: that it will eliminate from industry the friction of industrial warfare and its consequent social waste, at the same time giving reasonable assurance that the individuals and corporations concerned shall lose nothing which the operation of competitive forces would secure for them. In a sense the sliding scale is a prosperity-sharing plan. Now it is quite obvious that the prosperity of the cotton manufacturing industry is not a thing to be measured by the manufacturer's gross margin of profit. This method of prosperity measurement takes no account of the

changing volume of trade under changing margin conditions. It is entirely conceivable that the textile mills of New England may secure larger sums of money available for dividends under conditions of narrow margins and large sales than under conditions of wide margins and small sales.

To these considerations bearing upon the inadequacy of the margin as a basis of wage calculation add another — that the margin as calculated at Fall River was a crude one, which ignored entirely not only the volume of trade but also the existence of heavy fixed charges upon the business.

As concrete evidence of the inadequacy of the margin basis of wage adjustment witness the failure of the Fall River manufacturers to insist upon rigid adherence to the terms of the agreement of 1907, when, in 1908, "believing that indications point[ed] to a prosperous season" they made slight recognition of existing low margins. That the mill owners, through their representatives, were scrupulously insistent that their considerate action should not be regarded as a precedent is beside the point. A schedule of margins and rates of wages had been agreed upon, and within eighteen months the schedule was found to be not at all indicative of wage-paying ability.

Fourth, it is doubtful whether it is practicable to find the real margin of profit. The sliding scale agreements are to be criticised on the ground that in the calculation of the margin of profit only two grades of cloth were considered. Although at Fall River there is a greater degree of homogeneity of the cloth products of the mills than is found in many of the New England textile centres, it is true that here at any one time thousands of employees are engaged in the production of cloths other than the 28-inch and 38½-inch prints. If the wages of these operatives are to slide in accordance with changing margins of profit, it would seem no more than reasonable to expect that the margin be calculated with reference to more than two kinds of cloth. For there can be no assurance that the prices of these two cloths are indicative of the cloth market so far as these particular mills are concerned.[1]

1. It is interesting to note that the 28-inch 64 x 64 prints are no longer regarded as the most typical mill products. The best statistical tabulations of cloth prices now give instead quotations on 27-inch 64 x 60 prints.

A similar criticism might be made of the use of quotations on middling upland cotton alone. But this criticism is of minor importance, for there is reason to think that the prices of the several grades of cotton other than the middling upland bear a more constant relation to those of the latter grade than do the prices of all the different cotton fabrics to those of regular and standard prints. However this may be, we are concerned with cotton prices more with respect to the extent to which these quotations are indicative of mill costs, assuming the logically most simple possible condition, namely, that only middling cotton is used by the mills — a condition which is, of course, contrary to fact.

This is a matter which has to do with the times of margin calculation and wage adjustment under a sliding scale. The evil result of weekly calculations has already been indicated in the narrative of events of the first experiment in 1905–1906. No doubt the six-month basis was an improvement. But there is a difficulty present no matter upon what intervals agreement is reached. There is not much object in averaging raw cotton prices for a week or even for six months with a view to determining wages unless it is known that the cotton used in production was actually bought at the prices averaged. Examination of commercial statistics shows that by far the heaviest buying of cotton stocks by mills in the northern part of the United States and in Canada is in the months of October, November, December, and January of each year. In the five years of the sliding scale experiments an average of over 57 per cent. of the takings by these mills was in these four months.[1] The lowest percentage of these takings in these four months (45) was in the season 1907–1908, and the highest (66) in the season 1909–1910. It is evident that any system of basing wages on margins averaged for six-month periods ending in May and November does not fairly allow for the uneven distribution of cotton purchases throughout the year. And yet an adjustment

1. This computation is from Shepperson's *Cotton Facts*, edition of December, 1907, p. 26; edition of December, 1910, p. 26.

of the dates of margin and wage calculations to meet this seasonal fluctuation is not easy for the fluctuation is not regular.

To make a more positive statement of this criticism — the calculation of margins, if made at all, should be made with a knowledge of the prices at which the mills concerned have actually bought supplies of cotton, and with a knowledge also of the prices actually received from time to time for the mill products. Only in this way can the real margin be ascertained. Probably this criticism is destructive rather than constructive. It is doubtful whether it would be feasible to make a sliding scale agreement which would reveal not only to employees but also to competing enterprisers the marketing policies of each corporation.[1] The probable result of such an attempt to eliminate labor disputes would be the bargaining of each mill with its own employees and the elimination of collective bargaining on a large scale. It is reasonable to suppose that mill owners would resort to pure profit-sharing devices rather than to accept a system which would disclose methods by which profits are secured.

Fifth, this experiment was based upon the ungrounded assumption that wages in any one industry can be determined by rules which relate only to the internal affairs of that industry.

The ability of cotton textile operatives to secure an advance or to resist a reduction of wages cannot be measured solely by market conditions within the industry. Margins of profit have to do with the demand for labor; but the prosperity of the cotton manufacturing industry, however indicated, does not constitute the sole demand for the services of cotton mill operatives. Of this witness the attraction of mill workers into munitions factories. Also margins of profit are not directly related to the supply of labor, which cannot be regarded as a fixed or even steadily growing quantity, but which varies with population changes, both quantitative and qualitative. That labor supply tends to conform to labor demand is a mere truism, which means that

1. See the statement of Mr. Edward Stanwood, secretary of the Arkwright Club of Boston, in a review of Professor Copeland's book in the American Economic Review, vol. III (June, 1913), p. 372.

the number of goods or services sold must be equal respectively to the number of goods or services bought. It must be evident that any formal agreement, however elaborately drawn, if based upon intra-industrial conditions only, cannot be expected to guarantee to either workers or employers all that could be secured by hard bargaining under competitive conditions. That is, at comparatively frequent intervals the whole sliding schedule would have to be considered anew. *Ipso facto* the scale would not slide; it would become a new scale.

This brings us to a final critical comment upon the sliding scale plan: That the detailed construction of a schedule of margins and wages, in the last analysis, is a matter of the comparative bargaining powers of employers and employees.

As we have seen, the sliding scale experiment was abandoned in 1910; first, because the employees were dissatisfied with the failure of rates to slide upward, and, second, because they were unable, in considering the extension of the agreement, to raise the whole scale of rates to a level satisfactory to themselves. In spite of the fundamental unsoundness of the whole scheme, it is not improbable that it would have been continued beyond the spring of 1910, if both sides had been able to agree upon a new schedule.

The difficulty appears to be that there is no criterion by which the economic correctness of any proposed schedule may be judged. What would be an economically correct schedule? Presumably such would be a schedule which would accord to either party all that could be secured by the most vigorous and keen bargaining. Or, to put the question in another form, what is the criterion of the wage-paying ability of an industry? We do not know. The answer is still in process of being evolved in the cases of public and quasi-public utilities. Governor Douglas, in 1905, when arbitrating the wage dispute at Fall River, made certain allowances for dividends and for depreciation. But other authorities might make different allowances for the same items. This is a difficult problem, especially in the case of the Fall River cotton mills, regarding whose capitalization comparatively little is publicly known.[1]

1. Cf. Copeland, op. cit., ch. 15.

The answer to the last two criticisms (that adjustments of any sliding schedule must be made periodically to meet changing industrial conditions and that there is as yet no criterion by which the sliding schedule may be made accurately to reflect the state of the competitive markets for labor) may be of this nature: That great nicety of adjustment is not to be expected in such a schedule; that some gain will be effected if only the wastes of industrial conflict can be avoided; and that "in the long run" one side will gain through this inaccuracy of adjustment as much as the other. Of this last contention, however, there is no certain proof. While it might be safe to rely upon this supposed tendency to equalize advantages and disadvantages thus arising, if the sliding scale scheme were fundamentally sound, we have seen that in the Fall River case, at least, this soundness did not exist.

From May 26, 1908, the last date in the sliding scale period on which the piece rates actually changed, until March 25, 1912, the weaving piece rate remained 19.66 cents. On the latter date, at the conclusion of the textile strike at Lawrence arising out of the legislation reducing the length of the working day for women and children, the weaving rate became 21.62 cents per cut, involving an advance of 10 per cent. Then there followed a period of nearly four years with no change in piece rates, culminating January 24, 1916, when under the combined operation of war demands on the cotton industry itself and of demand for workers in munitions factories the textile operatives of Fall River, as well as those of all New England, entered upon a period of frequent and considerable wage advances.

The weaving rate determined upon January 24, 1916 was 22.71 cents, involving an advance of 5 per cent. On May 1 of the same year another advance of 10 per cent. brought the rate to 24.98 cents. On December 4, 1916, the rate was again advanced 10 per cent. to 27.48 cents. Thus in 1916 alone after a long period of stable rates the Fall River operatives received advances which brought the rates at the end of 1916 to a level over 39 per cent. above those prevailing in 1908 under the sliding scale agreement, and 27 per cent. above those effective in March, 1912.

At the time of the advance of wages effective December 4, 1916, it was agreed that there should be no change for six months thereafter.[1] On May 4, 1917, the Textile Council notified the manufacturers that another advance of 10 per cent. was expected effective June 4 for the succeeding six months.[2] In the meantime the United States had become a participant in the world war, heavy demands had been and were being made upon the cotton manufacturing industry for army and navy supplies, the already prevailing scarcity of textile operatives caused by the drain to the munitions factories had been increased by voluntary enlistments for military service, and the operation of the machinery for the enforcement of the selective draft act held out the prospect of an even greater dearth of labor. Mills could ill afford stoppage of production, even if such stoppage had been permitted by the government. Consequently the advance requested was granted without delay, the new weaving rate being 30.23 cents.

In October, 1917, under the continued stimulus of war conditions the Textile Council at Fall River again requested an advance of wages, this time of 15 per cent. The manufacturers countered with an offer of 10 per cent. which was not accepted. Finally a compromise was effected at an advance of 12½ per cent, subject to the approval of a representative of the United States Department of Labor. The new weaving rate, 34.02 cents, became effective December 3, and finally was approved in February, 1918. The Government representative urged that the rate be continued until the end of the customary six-month period, about June 1.[3]

With the approach of the latter date the operatives asked for an advance of 25 per cent., but compromised at 15 per cent., bringing the weaving rate to 39.12 cents, effective June 3.[4]

Thus up to the end of the first half of 1918 advances of wages were secured at Fall River aggregating an increase over

1. Chronicle, November 18, 1916, p. 1818; August 25, 1917, p. 782.
2. Chronicle, August 25, 1917, p. 782.
3. Ibid., August 31, 1918, p. 869.
4. Idem.

the rates fixed May 26, 1908, of 98.98 per cent. and an increase over the immediately pre-war wages fixed March 25, 1912, of 89.01 per cent. Since the entrance of the United States into the war the gains in wages have aggregated 42.35 per cent. of the rates effective December 4, 1916.

Conditions in the industry from June until the first of November, 1918, were such as to give rise to serious expectation of further advances on December first. Unprecedented prosperity, in spite of governmental price control since the early summer, existed contemporaneously with an ever increasing shortage of labor caused not only by the extension of the draft law but also by the epidemic of influenza. But with the signing of the armistice there came an abrupt change in the form of stoppage of production. The Fall River Textile Council late in November presented a request for another advance of rates. Refusal by the employers was prompt and firm, and was acceded to with little delay by the operatives. From that time until the completion of this monograph in May, 1919, operation continued on the basis of the 39.12 cents weaving rate, modification of working conditions caused by the new market conditions taking the form chiefly of the forty-eight hour week.

CHAPTER III

The Movement of Full Time Earnings in the Massachusetts Cotton Manufacturing Industry, 1860–1891

The statistical materials assembled and analyzed in the preceding chapter relate directly to rates of wages. Next, logically, come earnings, that is, the sums of money actually received by operatives per day or per week; and since this study is primarily historical, relative earnings or "index numbers" of earnings will first claim our attention. Furthermore, we are here concerned with full time earnings. Unemployment and its effects upon pay envelopes in different years constitute a topic for separate consideration, reserved for Chapter V. In the present chapter and the one immediately succeeding, the assumption is made that the quotations of daily and weekly earnings selected from the available statistical raw materials were originally compiled as being typical of conditions prevailing in the years or other periods in question. Hence the significance of "full time earnings" in the titles of Chapters III and IV.

For the study of relative full time earnings of employees in the cotton manufacturing industry of New England since 1860, the chief sources of statistical information are such as to make advisable a three-fold division of the period. For the years 1860–1880 there exist two comprehensive bodies of statistical raw materials—the so-called Weeks Report in Volume XX of the reports of the Tenth Census, and the well known Aldrich Report of 1893.[1] These sources have been ably examined by Professor Wesley C. Mitchell in his *Gold, Prices, and Wages under the Greenback Standard.* From the results of his study of general wage movements there have been selected for presentation here the facts of importance relating to the cotton mills of New

1. Senate Committee on Finance, *Report on Wholesale Prices, on Wages, and on Transportation.* Senate Reports, 52d Congress, 2d Session. Report 1394, pts. 1-4.

England. These facts, supplemented by explanatory material, serve here as the foundation for the earnings statistics covering later years.

For the years 1880–1891 the most nearly complete and satisfactorily comparable earnings statistics are found in the volumes of the Aldrich Report. These materials have not heretofore been examined for the purposes of such a study as the present one, and it has been the task of the present writer to apply to certain of these series of wage quotations statistical methods calculated to secure continuations of the curves of relative full time earnings constructed by Professor Mitchell for the years 1860–1880.

Third, for the period since 1890 there are available in the Reports and Bulletins of the United States Bureau of Labor and of its successor the United States Bureau of Labor Statistics materials for the construction of nearly complete series of full time earnings for five occupational groups of cotton textile employees. These series have been modified somewhat for purposes of comparative analysis, with special reference to the effects upon earnings of legislation reducing the hours of labor.

The present chapter contains an analytical and explanatory discussion of the first two periods described, 1860–1880 and 1880–1891. The next succeeding chapter covers the period 1890–1916.

The exhibits of the Aldrich Report include wage data for five establishments manufacturing cotton cloth, of which four were in Massachusetts. From the original exhibits for these four mills Professor Mitchell constructed 135 occupational series of relative earnings for the years 1860–1880, using as a base (100) for each series the actual wage reported to have been paid in January, 1860.[1] These series represented all of the occupations reported for the mills in question, including several "non-textile" or "non-operative" groups of workers, such as overseers, mechanics, yard hands, sweepers and scrubbers. From these series there were then constructed other series presenting general

1. See Table 5 in the appendix of his volume.

conclusions regarding all the employees and different groups of them.[1]

The materials of the Weeks Report embrace tabulated returns from thirty-five cotton manufacturing establishments, of which thirty were located east of a line drawn north and south at the eastern boundary of Ohio, and of which twenty-two were in New England. Of the twenty-two New England mills, six were in Connecticut, three in Maine, six in Massachusetts, six in New Hampshire and one in Rhode Island. Professor Mitchell studied as one group the thirty mills east of Ohio, so that exact comparison of the Aldrich and Weeks materials is not possible. Unlike the Aldrich Report, the Weeks Report made no record of the number of employees receiving each designated wage. For general purposes, therefore, as well as for the purposes of the present investigation, the information of the Weeks Report as analyzed by Professor Mitchell is not as satisfactory as that of the Aldrich Report; but it is useful chiefly to serve as a check upon the latter. That there is little difference between the conditions depicted by the two sets of figures is shown by the accompanying Table (VIII) and Chart (II) of relative earnings computed by the method of simple medians.

1. For a detailed description of the methods used, see Mitchell, op. cit., pp. 94-97.

TABLE VIII [1]

Simple Medians of Relative Full Time Earnings in the Massachusetts Cotton Industry, 1860–1880

(Computed from the Aldrich and Weeks Reports)

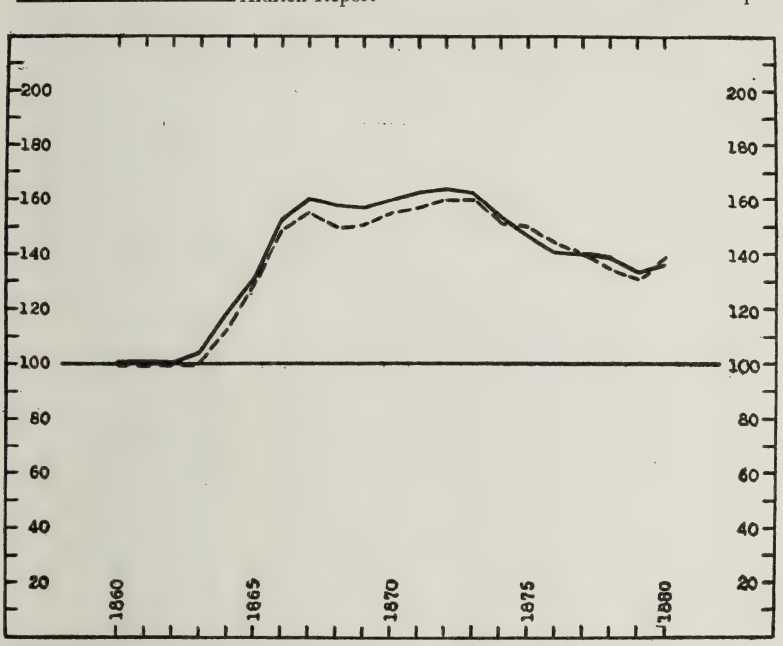
Year.	Aldrich.	Weeks.	Year.	Aldrich.	Weeks.
1860	100	100	1871	163	157
1861	100	100	1872	164	160
1862	100	100	1873	163	160
1863	104	100	1874	154	152
1864	118	112	1875	147	150
1865	131	129	1876	141	144
1866	153	149	1877	140	140
1867	160	155	1878	138	135
1868	158	150	1879	133	131
1869	157	151	1880	136	139
1870	160	155			

1. This table has been compiled from the table on pp. 208-210 of Professor Mitchell's volume. The semi-annual Aldrich figures have been averaged to obtain one relative wage for each year. The simple rule of calling an average involving the decimal .5 or over equivalent to the next higher unit raises slightly in a few cases the level of the relative wage as compared with the corresponding figure of the Weeks Report.

For four years of the twenty-one the median relatives of the two sets of quotations are identical, for each of three years there is a difference of two points, for five years a difference of three points, for three years four points, for two years five points, for three years six points, and for one year eight points. The differences of movement shown by the two curves are differences of magnitude rather than of general direction.

CHART II

The Movement of Full Time Earnings in the Massachusetts Cotton Industry, 1860–1880, as Shown by the Method of Simple Medians



Therefore, using the results of Professor Mitchell's work with the data of the Aldrich Report, Table IX is presented showing the movements of the Greenback prices of gold, of relative wages in the four Massachusetts cotton mills (by the methods of weighted averages and weighted medians), of relative wholesale and retail prices of cotton textiles, and of general retail prices in the eastern part of the United States. On Charts III and IV are curves plotted on series of relatives selected from Table IX.

TABLE IX [1]

The Movements of Full Time Earnings in Massachusetts Cotton Mills, and of Prices, 1860–1880

Years.	Prices of gold in greenbacks.	Wages in cotton mills.				Commodity prices.		
		All employees.		Females.	Males.	Cotton textiles.		
		Weighted averages.	Weighted medians.	Weighted medians.	Weighted medians.	Wholesale.	Retail.	Commodities in general at retail in eastern United States.
1860	100	101	100	100	100	100	100	100
1861	100	97	102	103	100	98	124	112
1862	113	98	101	104	99	161	197	129
1863	145	108	106	107	103	292	287	149
1864	203	127	117	112	120	462	414	179
1865	157	140	139	143	136	411	373	189
1866	141	161	170	172	166	320	304	181
1867	138	167	175	182	168	227	236	172
1868	140	165	170	174	164	181	205	169
1869	133	169	175	177	167	174	173	162
1870	115	166	174	179	172	159	158	152
1871	112	177	186	194	171	146	135	140
1872	112	183	192	209	174	151	130	136
1873	114	178	190	205	173	140	123	137
1874	111	163	182	199	169	124	116	135
1875	115	150	169	181	161	112	109	130
1876	112	145	163	174	157	93	102	125
1877	105	142	151	160	147	87	97	122
1878	101	145	151	168	147	79	92	116
1879	100	144	143	163	141	79	91	114
1880	100	153	151	165	141	90	92	115

Base (100)=quotations for 1860 (January quotations where such exist)

1. Compiled from materials presented in Mitchell, op. cit., pp. 91, 103-118, 278.

CHART III

The Movements of Full Time Earnings in Massachusetts Cotton Mills, and of Prices, 1860–1880

Base (100) = quotations for January, 1860

_____Weighted averages of relative full time earnings in Massachusetts Cotton Mills.

– – – – –Relative wholesale prices of cotton textiles.

...x...x...Relative general retail prices in the East.

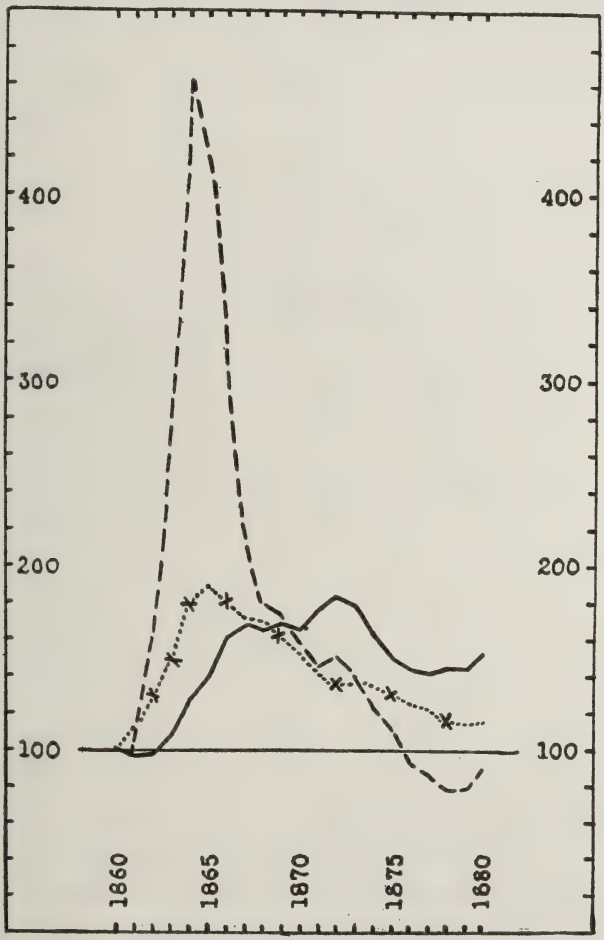
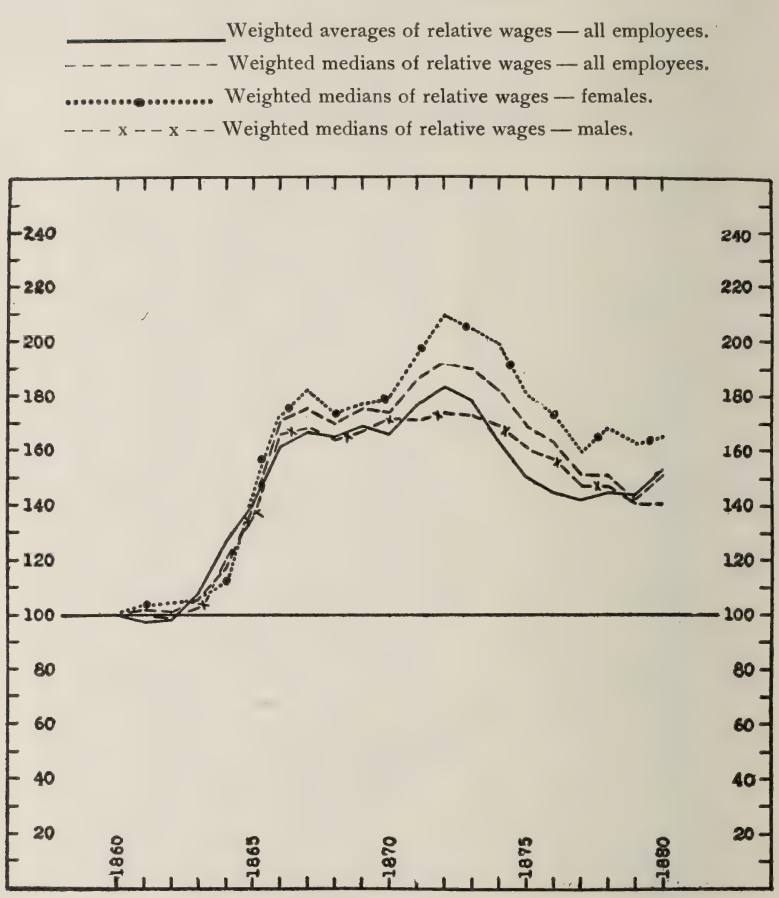


CHART IV

The Movement of Full Time Earnings in the Massachusetts Cotton Industry, 1860–1880; by Sex Groups

Base (100) = quotations for January, 1860



Examination of Table IX and of Charts III and IV shows that, for the employees of these textile establishments considered as one group, wages (as measured by the method of weighted averages) fell slightly from the level of 1860 in 1861 and 1862, but from 1863 to 1867 rose steadily to a point 67 per cent. above the level of January 1860. In the three-year period 1868-1870

inclusive, full time earnings fluctuated somewhat, but after 1870 rose again until in 1872 they were at a point 83 per cent. above the level of January, 1860. After 1872 there occurred a decline of wages, slight at first, but after 1873 rapid, reaching its low point in 1877; but this low point was still 42 per cent. above the level of the wages of January, 1860. The period ends, in 1880, with the wage level 53 per cent. above the base line.

Comparison of the series of weighted averages and of weighted medians for all employees shows that the use of the method of weighted averages as compared with that of weighted medians does not magnify the upward change of wages after 1860. And the differences between the two sets of relative figures in these two cases are of negligible importance. While for nearly all of the period the weighted medians show advances of wages somewhat greater than do the weighted averages, the two curves are approximately parallel. The curve of weighted averages is therefore selected as the more conservative and for the additional reason that the method of weighted averages tends to eliminate overstatements of wage movements which might be due to unrepresentative distribution of wage quotations in the tally sheets for any one year.

The results of the use of the weighted medians have been presented here to make possible comparison of wage changes applying to the sex groups. Chart IV shows clearly that the women in these cotton mills shared in the wage advances of the greenback period to a greater degree than did the men, their advances being about 50 per cent. greater than those of the men.

The table and the charts just referred to present in statistical form the chief facts relating to wage and price movements in the greenback period. It now remains to suggest some of the forces motivating these textile wage movements and to present such pieces of evidence bearing upon them as have been possible of collection from contemporary records.

Some reference is undoubtedly due to the displacement of gold money as the circulating medium and standard of value during the major part of this early period; to the effects of paper currency inflation upon price movements. Our interest here,

however, is in special markets for labor and for commodities. Conditions existing in the cotton and cotton cloth markets during the Civil War were somewhat peculiar to these markets, the prime factor at work being the so-called "cotton famine." The then fabulous prices of raw cotton, which would normally enter into manufacturers' costs and so contribute to determine the lower limit of prices of mill products, were prices indicating, not so much a depreciation of the currency, as inability of manufacturers to obtain raw materials on any considerable scale. As to the trading in cotton that was done, to the extent that both the raw cotton and dry goods markets were highly organized, there would be a tendency for their prices to respond quickly to changed conditions of the currency. At the same time, to the extent that in either of these markets there was dealing in futures and that in the conduct of cloth manufacturing there prevailed the custom of production of goods on orders for delivery at more or less remote dates in the future, this quick adjustment of prices to changed currency conditions would be stabilized. Moreover, the use in textile manufacturing of a large amount of elaborate and expensive equipment, involving heavy fixed costs, would further retard the adjustment of cloth prices to a depreciation of the currency. There is found, however, as was to be expected, little correlation between wage and price movements in the cotton manufacturing industry and the greenback prices of gold. In as much, also, as the prices of cotton textiles both at wholesale and at retail declined more rapidly after the termination of the Civil War than did the retail prices of commodities in general, we must look more particularly into the cotton manufacturing industry itself to secure an explanation which even approximates giving satisfaction, regarding the competitive forces at work affecting wages.[1]

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1. The downward movement of the prices of cotton goods from 1863 to 1871 may be considered to be chiefly the evidence of transition from abnormal to more normal conditions in the production and marketing of cotton and in the manufacture of cotton cloth. The more gradual downward tendency of prices from 1873 to 1879 is in general agreement with the downward movement of prices in general. Note that cotton goods, both at wholesale and at retail declined more than did commodities in general.

In a sense the rapid upward movement of the curve of weighted average relative wages from 1862 to 1866 is misleading. The quotations upon which this curve is plotted are not at all indicative of prosperous conditions and large employment of labor; but are rather quite similar to the nominal quotations of commodity prices at times when producers are not able to fill orders. The shutting off of the source of supplies of raw cotton at the outbreak of the Civil War caused serious stoppage of mills throughout the North. It happened that no one of the mills for which data are given in the Aldrich Report was closed at the dates for which pay rolls were examined. But the number of employees enrolled steadily decreased from 1,207 in January, 1860, to 741 in July, 1863; and not until January, 1866, do the records show a total number employed as great as the force in January, 1860. In the Weeks Report there are several instances to be noted in which there was complete stoppage of operation.[1] It happened that in view of a prospective crop shortage in 1861, with no reference to the coming rebellion, some manufacturers had laid in large supplies of raw materials and by careful husbanding of this stock were enabled to keep in operation much longer than their competitors. But the shortage began to be felt very keenly in 1862 and was at its maximum in 1863. Toward the end of the war some cotton was bought through the Government under regulations imposed by the Treasury Department. Fite tells[2] us that during the first year of the war the mills were for the most part operating on two-thirds time and during the second year on one-fourth to one-half time. Mr. Samuel Batchelder, a mill manager, says[3] that in 1863 about one-third of the spindles of the Northern states were kept in operation.

Mr. Charles Cowley of Lowell stated[4] in 1868 that "nine of the great corporations of Lowell, under a mistaken belief that they could not run their mills to a profit during the War,

1. Weeks Report, pp. 331, 348, 350, 352, 356, 358, 361, 366.

2. Fite, Emerson D., *Social and Industrial Conditions in the North during the Civil War*, p 86.

3. Batchelder, Samuel, *Introduction and Early Progress of the Cotton Manufacture*, (1863), pp. 97, 98.

4. Cowley, Charles, *History of Lowell*, (revised edition, 1868), p. 60.

unanimously, in cold blood, dismissed ten thousand operatives, penniless, into the streets!" The New York Herald in its issue of January 13, 1862 (p. 3) published a long article on the condition of the textile industries. In the discussion of the cotton manufacturing industry, under the heading, "What has become of the operatives?" there is the following.

> From extended inquiry we find that the contraction of manufacturing has released about seventy thousand operatives from the mills. About one-third of these are males who have mostly walked out of the factory into the camp, and are doing good service in endeavoring to wrest cotton from the grasp of the rebels. The female factory hands of New England have, in many instances, returned to their rural homes until the return of better times, and others have employed themselves in making up clothing for the army. But so far there has been nothing like suffering among the operatives, consequent upon the disarrangement of manufacturing

When, at the conclusion of hostilities, supplies of raw materials became more easily available and resumption of mill operations commenced on a large scale the markets for labor and for goods were quite altered from the conditions of 1860. Mr. David A. Wells in a report to the Secretary of the Treasury dated December, 1866 stated[1] that throughout the northern states manufacturing industries had suffered a loss of desirable employees since comparatively few of the men who entered the army from the factories returned to their former occupations. Mr. Cowley also refers[2] to the stoppage of work by the Lowell mills as a great mistake in policy, since, when the mills reopened, there was difficulty in securing competent operatives. He especially criticises the mill owners for having made no adequate provision for the employment of overseers and more skilled workers many of whom in the years of war joined the enterpriser class.

But more particularly was there a scarcity of women and girl operatives. It has already been stated that the reopening of the mills after the war failed to attract many of the former

1. Senate Executive Documents, 39th Cong., 2d Sess., Doc. 2, p. 21.
2. Cowley, op. cit., p. 61.

female operatives of American stock. The situation in the market for women cotton mill workers may best be described in the words of Commissioner Wells.

> The opening up of many new employments to women, coupled with an increased prosperity of the agricultural classes, has also produced in many sections of the country, an unusual scarcity of female operatives. This is particularly the case in the manufacturing districts of New England, and has not been remedied by an advance in wages. The average rate of wages paid to adult female operatives in New England cotton mills is reported to be one dollar per day, while in cases of the more skilled operatives, earnings of from twenty to thirty, and even forty dollars per month, exclusive of board, are reported. As an illustration of the independence of labor over capital in this department, it may be stated that, during the summer of 1866, the product of the cotton mills of New England was variously reduced from five to twenty-five per cent., through the inability to obtain female operatives, even with the inducement of the highest rates of wages ever paid in this branch of manufacture. In one instance specifically reported to the commissioner, (viz; the Amoskeag Manufacturing Company, New Hampshire,) at least twenty-five per cent. of the machinery stood still for a period of three months in 1866, for the sole reason of an inability to procure operatives.[1]
>
> Another result growing out of this competitive demand for labor is, that the labor itself becomes unstable in its character; to meet which a not uncommon practice has prevailed in New England of offering ten per cent. in addition to the ordinary rates of wages, conditioned on the continuance of the engagement for a certain definite period.[2]

The phenomenon above referred to, that is, the relatively greater scarcity of female as compared with male operatives in the years immediately following the conclusion of hostilities, is reflected in the diagram depicting the wage movements of the sex groups of employees. These curves of weighted medians of relative wages rise abruptly during the war years, attaining in

1. Senate Executive Documents, 39th Congress, 2d Session, Doc. 2, p. 22.
2. Ibid., p. 23.

1867 levels considerably favoring the women. From 1867 on until the end of the period here under study these superior gains, although subject to greater fluctuations than those of the men, were in general maintained. In 1880 the relative wages of the women, as compared with those of 1860 by the use of the weighted medians, showed a gain of 65 per cent., while the gain of the men during the whole period was about 41 per cent.

Contemporary accounts give interesting information concerning the downward course of wages after the panic of 1873. In November of that year the Commercial and Financial Chronicle noted[1] editorially the stoppage of the cotton mills, which, it said, was not due to any fundamental unsoundness in the cotton manufacturing industry itself, but to the panic, with its resulting stoppage of sales and difficulty of collections.

But the next year witnessed a depression more peculiar to the cotton industry itself. On September 23, 1874 treasurers and managers of mills met in Boston to consider plans for the relief of the depressed market for cloth. It was voted at this meeting that[2] "it is imperatively required that the production of the cotton mills of New England should be reduced by at least one-third, until the proper relation between the cost of production and the market value of goods shall be re-established, and the relation between supply and demand adjusted. At a second meeting a working schedule of four days a week was agreed upon.[3] At a similar meeting held at Providence on September 25th it was unanimously agreed to reduce production one-third for the following three months. At this meeting, according to the Chronicle,[4] "facts were submitted showing that the prices of most of the cotton fabrics [were] below the actual cost of production."

1. Commercial and Financial Chronicle, November 1, 1873, pp. 583, 584.
2. Ibid., September 26, 1874, p. 333.
3. Ibid., October 3, 1874, p. 355.
4. Ibid., September 26, 1874, p. 333. The Chronicle of January 1, 1876 comments (p. 4) on the difficulty of carrying out systematic and combined curtailment. Some additional references in the same publication to curtailment are April 3, 1867, p. 455; June 8, 1867, p. 757; June 22, 1867, p. 789; November 16, 1867, p. 615; October 29, 1870, p. 554.

The extent and seriousness of the depression which this policy of curtailment was intended to relieve is shown by the fact that despite the remedial measures attempted the market was very slow in reviving. Although there was some difficulty in securing uniformity of curtailment — some mills, particularly those in Lowell, failing to get into line in the carrying out of the plan — the systematic curtailment probably amounted to 25 per cent. of normal production. This was supplemented by enforced idleness because of shortage of water power and because of strikes. The reduction of operation caused by all of these factors was estimated to amount to 33⅓ per cent. which was what the original plan contemplated. The market, however, did not quickly respond and would not take the small amounts of goods offered.[1] Not until the summer of 1876 were there indications of a recovery of the print cloth market[2], which had been most affected by the depression.

In 1880, then, we have the following situation. Gold in terms of Greenbacks was at par. Raw cotton was 12 per cent. higher in price than in 1860, although in 1879 it had been at the same price as in 1860. Cotton goods were selling at wholesale for 10 per cent. less than in 1860, and at retail for 8 per cent. less. Commodities in general retailed in the East at prices averaging about 15 per cent. more than in 1860, while wages in the cotton industry, so far as the Aldrich data are typical, averaged about 53 per cent. higher than immediately before the outbreak of the war, while the cost of living was about 25 per cent higher.

We have seen that the premium on gold had little direct explanatory connection with the war prices of cotton and of cloth and could therefore have had little direct effect upon the earnings of the comparatively few operatives employed during the war. A temporary scarcity of operatives, especially of women and girls, apparently operated to secure for the workers a higher wage standard when full manufacturing activity was resumed; while the dull years of 1873 to 1877 as reflected in lower prices and curtailment of production brought gradually decreasing

1. Commercial and Financial Chronicle, February 13, 1875, p. 166.
2. Ibid., August 5, 1876, p. 124.

earnings. The figures for 1879 and 1880 show slightly improving conditions with respect to both prices and wages.

In order to trace at all accurately the course of full time earnings in the New England cotton manufacturing industry from 1880 to 1890, it is necessary to have recourse again to the data of the Aldrich Report, since these constitute the most reliable and comprehensive body of information available. Yet it is not possible to rely upon the final report of this committee as formally presented, for the reasons which caused Professor Mitchell to go to the original Aldrich Report exhibits and apply to the information therein contained more discriminating statistical methods than were applied in the compilation of the Aldrich Report itself. As Professor Mitchell shows,[1] in this report either there was no allowance made for differences in the sizes of the groups of employees represented by the several wage quotations in the original exhibits or there was used a faulty method of weighting (on the basis of the census returns for occupations). Also, an arbitrary and unwarranted distinction was made between the establishments reported as manufacturing cotton goods and the one establishment reported as manufacturing ginghams.

Therefore there is presented here a continuation for the period 1880–1891 of the work done by Professor Mitchell for the greenback period. In the application of Professor Mitchell's methods, however, the number of series of quotations has been considerably reduced. Professor Mitchell constructed 135 series of relative wages, but they were not all representative of distinctly textile operative occupations. Beltmen, blacksmiths, boilermen, carpenters, machinists, masons, oilers, watchmen, scrubbers, sweepers and yard hands, although employed by textile mills, are not in a narrow sense textile operatives. The wages which these persons receive have not necessarily a close relationship to the wages of spinners, weavers, carders, slashers and pickers, but are rather determined by conditions in the local labor market in these several occupations. Moreover, overseers in

1. *Gold, Prices, and Wages under the Greenback Standard*, pp. 169-172, and *History of the Greenbacks*, pp. 280-282.

the mill departments, while textile workers, are not operatives in the sense in which this word is commonly accepted. They are rather technical experts and skilled managers. The series of quotations in the Aldrich Report, then, for these groups were excluded from consideration, with the result that there remained 74 occupational series. Of these 27 represented females, 46 represented males, 29 represented males who in 1860 received wages of less than $1.00 per day, and 17 represented males who in 1860 received $1.00 or more per day. In January 1880, 1,419 persons were represented as compared with 1,774 in the series used by Professor Mitchell; in July, 1891, 1,883 were represented.

To these 74 occupational series, then Professor Mitchell's methods were applied retaining as a base (100) the wages reported as being paid in January, 1860, in order to secure comparability with the results of the study of the greenback period. That Professor Mitchell's inclusion of the non-textile occupational groups did not destroy the representative character of his results so far as concerns the New England cotton manufacturing industry, and that it is possible to treat the present computations of relative full time earnings for the period 1880–1891 as comparable with Professor Mitchell's series, is evidenced by the figures of Table X, showing the results of the application of the same statistical methods to the two bodies of data for the year 1880.[1] The discrepancies in results are so small as to be negligible for the purposes of this study.

1. See Mitchell, *Gold, Prices, and Wages under the Greenback Standard*, pp. 118, 120, 210. By "weighted averages" is meant an average computed by counting each relative wage in the series once for each employee listed at that wage. Similarly a "weighted median" is a median found by listing each relative wage once for each employee listed as receiving that wage. By the "simple median" method each relative wage is listed only once regardless of the number of employees represented.

TABLE X

Relative Full Time Earnings in the Massachussetts Cotton Industry in the year 1880

Base (100) = quotations for January, 1860

A. Results of the use of 135 occupational series of quotations.

	Weighted Averages.	Weighted medians.			Simple medians.
	All employees.	All employees.	Females.	Males.	All employees.
January	152	149	166	141	135
July	154	152	163	140	137
Average	153	150.5	164.5	140.5	136
B. Results of the use of 74 occupational series of quotations.					
January	152	149	164	141	136
July	157	152	163	140	137
Average	154.5	150.5	163.5	140.5	136.5

The results of the statistical analysis of the raw materials of the Aldrich Report for the years 1880–1891 are presented in Table XI and Chart V, showing respectively series and curves (based upon the series) of weighted average relative wages. The base used by Professor Mitchell for the greenback period is here retained, so that the curve of weighted average relative wages of all employees for the later period may be regarded as a continuation of the corresponding curve plotted by Professor Mitchell.[1]

1. There is, of course, a failure of the series for the two periods to connect perfectly, when weighted averages of relative wages are used, as in the body of this study. (See Table X). In constructing a series to summarize the movement of earnings for the whole period since 1860, the writer has used for the year 1880 a compromise figure, 154. See Chapter VI.

TABLE XI

The Movement of Full Time Earnings in the Massachusetts Cotton Industry, 1880–1891

Base (100) = quotations for January, 1860

Year.	Month.	All employees.	Females.	Males.	Males who in 1860 received less than $1.00 per day.	Males who in 1860 received $1.00 or more per day.
1880	January	152	170	139	143	129
	July	157	171	141	144	134
	Average	155	171	140	144	132
1881	January	147	155	138	140	133
	July	151	167	132	136	131
	Average	149	161	135	138	132
1882	January	158	171	141	143	134
	July	156	162	148	154	135
	Average	157	167	145	149	135
1883	January	160	173	145	149	136
	July	156	171	136	137	133
	Average	158	172	141	143	135
1884	January	154	165	138	141	131
	July	156	167	141	145	129
	Average	155	166	140	143	130
1885	January	150	160	136	139	128
	July	149	158	136	140	126
	Average	150	159	136	140	127
1886	January	149	157	136	140	126
	July	157	168	142	148	126
	Average	153	163	139	144	126
1887	January	158	163	150	155	134
	July	162	170	151	156	135
	Average	160	167	151	156	135
1888	January	162	169	150	155	135
	July	165	172	155	162	136
	Average	164	171	153	159	136
1889	January	166	177	148	152	138
	July	172	182	157	162	139
	Average	169	180	153	157	139
1890	January	168	178	154	158	141
	July	173	182	158	163	143
	Average	171	180	156	161	142
1891	January	171	180	158	163	143
	July	173	183	158	164	142
	Average	172	182	158	164	143

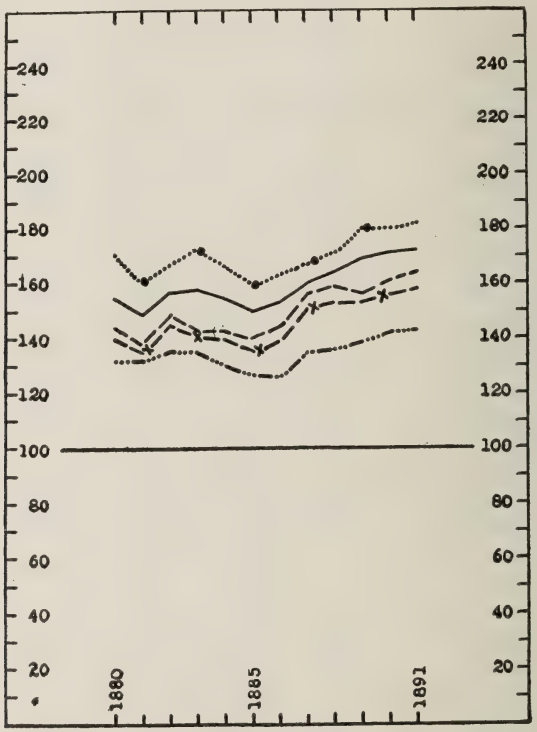
In averaging the two relative wages for each year .5 or greater has been considered as 1. in order to secure comparability with the work covering the earlier period.

CHART V

The Movement of Full Time Earnings in the Massachusetts Cotton Industry, 1880–1891

Base (100) = quotations for January, 1860

———— All employees.
.....●.....Females.
—x—x—x—Males.
– – – – – – – – –Males receiving in 1860 less than $1 per day.
...–...–...–...–...Males receiving in 1860 $1 or more per day.



For the employees treated as a single group, the upward movement of wages which began in 1878 and continued in 1880 was of short duration. The decline to the low relative wage of 149 in 1881 was likewise temporary, wages rising in 1883 to a point higher than in any preceding year since 1874,

the first year of depression following the panic of 1873. The panic year of 1884 witnessed a slight decline and the following year a greater one; so that wages approached again the low level of 1881. The years following 1885 showed steadily increasing earnings, the relative wage of 1891 being 172.

Examining the curves of wages for the separate groups of workers, we find that, as in the greenback period, the relative wages of females (using the January, 1860 quotations as the base of 100) were higher than those of males. Moreover, the men who in 1860 were paid less than $1 per day received throughout this period greater relative wages than those who in 1860 received $1 or more per day. At the same time it should be noted that while during the short period following the greenback era the relative wages of the several groups were at the levels just indicated, using 1860 as the base year, the net gains of the male employees, and especially of those males who were the poorest paid in 1860, were far greater than those of the women. Measured in terms of the relative wage "points," all the employees advanced between 1880 and 1891 17 points, the females, 11 points, the males 18 points, the males who in 1860 received less than $1 per day 20 points, and the better paid males 11 points. In other words, those employees who in the greenback period made the least gains in wages began during the period 1880–1891 to catch up with their fellow workers.

CHAPTER IV

THE MOVEMENT OF FULL TIME EARNINGS IN THE COTTON MANUFACTURING INDUSTRY OF MASSACHUSETTS, MAINE AND RHODE ISLAND, 1890–1916

The most complete and detailed body of information available for the study of the movement of earnings in the New England cotton manufacturing industry for the years since and including 1890 is that published by the United States Bureau of Labor and its successor, the Bureau of Labor Statistics. This Bureau, in its 19th Annual Report (1904), commenced a series of tables showing wages and hours of labor in sixty or more manufacturing and mechanical industries. The information in this report covered the period 1890–1903. Bulletins 59, 65, 71 and 77, appearing in 1905, 1906, 1907 and 1908 respectively, continued the series of wages and hours quotations for the several industries. Bulletins 128, 150 and 190 (1913, 1914 and 1916 respectively) continued the series for the textile industries. Bulletin 239 (1918) extended the quotations for the cotton manufacturing industry.[1]

The materials relating to cotton manufacturing contained in these serial reports were collected by the agents of the Bureau from the payrolls of establishments in different states. Summaries were usually either for all the establishments represented or in some cases by geographical divisions. Obviously such a grouping of data could not meet the requirements of the present study, and therefore. recourse was had to the original exhibits or general tables of the reports in order to make a classification of data suited to the purpose in hand. From these scattered tables it was found possible to construct series of quotations for the period 1890–1916 for four of the

1. With the exception that no information was secured for 1915.

chief occupations in the cotton mills of three New England states, Massachusetts, Maine and Rhode Island. These occupations were those of card strippers or carding machine tenders, loom fixers, frame spinners and weavers. In the last named group separate series for the sexes were available. The members of the first two groups were males; those of the third group females. While, of course, the members of these few occupational groups form only a part of the force of operatives in any mill, it is to be remembered that they are the workers performing the tasks connected with the major or more fundamental processes.[1] And since it has been found that changes in rates of wages have affected all mill departments about equally, there is reason to suppose that the five complete occupational series available represent fairly accurately the changing wage conditions in the industry.

In the original tables published by the Bureau there were usually[2] presented for each year of each series three figures which are of interest here: (1) the average earnings per hour of the operatives whose wages were reported; (2) the nominal full time hours of labor per week; and (3) the nominal full time earnings per week. The third item is the product of the first two. The first item was found by ascertaining for each operative included in the investigation the total earnings for the payroll period and the number of hours worked and then dividing the former by the latter. Then the hourly earnings of all the operatives in the occupational group in all the mills were added and the sum divided by the number of items. Piece and time workers were all massed together, if it happened

1. For a particularly detailed description of the tasks of the several occupational groups in the cotton manufacturing industry, see Bulletin 239 of the Bureau of Labor Statistics, pp. 140–205.

The occupation of mule spinning is the chief one of importance for which a complete series of quotations is not available. This occupation, while important in so far as it is connected with a fundamental technical process and also since it belongs to a group of workers who may be considered to be among the most skilful of all textile operatives, comprises a membership which has in recent years declined relatively to the numbers of all textile employees.

2. The practice of the Bureau was not uniform. Sometimes the third item named in the text was omitted.

that in any group workers were employed under both systems. Thus earnings were reduced to a standard unit of calculation, the hour of labor.

Regarding the second group of items, full time hours of labor per week, in all but two or three cases the full time hours reported in the publications of the Bureau were the maximum hours allowed by state laws for women and minors. The exceptional cases appeared very early in the series, at a time when it was the custom of the Bureau of Labor to make allowance for short time operation if such a condition prevailed over ten months of the year. The first step, therefore, in the revision of the official figures consisted in the elimination of such unusual figures computed by a method no longer in use.

A second step of revision consisted of a refinement which makes allowance for the exact dates of effectiveness of state laws reducing the maximum hours of labor for women and minors. For example, the fifty-eight hour law of Massachusetts went into effect on July 1, 1892. This meant that the operatives worked for six months in 1892 under the sixty-hour system and for six months under the fifty-eight-hour system. The average full time operation of the mills in Massachusetts in 1892 was therefore fifty-nine hours per week, and to ascertain the nominal or full time earnings for a week in 1892, assuming the hourly quotations to be correct or representative of conditions, these hourly earnings should be multiplied by fifty-nine.

In 1910 and 1912 in Massachusetts the reductions of the working week became effective on January first. In Maine, likewise, the fifty-eight hour law went into effect on January 1, 1910.[1] In Rhode Island a similar law took effect on April 4, 1902.[2] The operatives in that state in 1902 therefore worked for one-fourth of the year under a full time system of sixty hours per week and for three-fourths of a year under the fifty eight hour system. The average full time week for the year was fifty-eight and one-half hours. The Rhode Island law of

1. Maine, Bureau of Industrial and Labor Statistics, 1909, p. 476.
2. Rhode Island, Public Laws, 1902, p. 73. (Ch. 994).

April 7, 1909 providing for the fifty-six hour week took effect on the first Monday in January, 1910.[1] The fifty-four hour law of the same state was effective July 1, 1913.[2]

Tables XII, XIII, and XIV and Charts VI, VII, and VIII exhibit the results of the work of piecing together the disjointed parts of series in the Bureau of Labor data and of making the slight modifications just described with respect to the calculation of full time hours and of full time earnings. The quotations of hourly earnings as given in the original tables have been unchanged except that for certain years where the quotation is marked by an asterisk quotations published in different bulletins covering different groups of establishments have been averaged. Such marked quotations do not include all the cases in which there has been an overlapping of reports, for cases frequently occurred in which different bulletins covering the same year gave identical quotations.

The relative wages given are the relative full time weekly earnings. The base for each series of relative full time earnings has been constructed by taking a simple average of the nominal full time earnings for the ten-year period 1890–1899. Obviously a series of relative full time weekly earnings for a series of years may serve as a series of relative full time earnings for the whole year, provided that the conditions of employment at the time the agents of the Bureau studied the payrolls were typical of conditions for the year, i. e., with respect to piece rates, quality of stock used, number of machines tended by each operative, and so forth.

Each one of the charts, which refer to the conditions in Massachusetts, Maine and Rhode Island, shows that during the last decade of the last century relative full time earnings for the groups of operatives covered fluctuated back and forth above and below the base line, being slightly above the base in 1893, slightly below in 1894 and 1895, very slightly above in 1896 and 1897, and below in 1899. The year 1900 witnessed the beginning of a marked upward movement which, although

1. Rhode Island, Public Laws, 1909, pp. 41, 42. (Ch. 384).
2. Ibid., 1913, pp. 6, 7. (Ch. 912).

checked in Massachusetts (in 1901 and 1902) and even reversed in Maine (in 1902 and 1903) and in Rhode Island (in 1901 and 1904) culminated in 1907. The panic of 1907 and the years of depression immediately following caused a marked decline of earnings and not until 1912 did earnings generally begin again to rise. Although the published reports of the Bureau of Labor Statistics do not bring the wage quotations up to date, they are sufficiently complete to indicate some of the results of the known advances of piece rates under the war conditions of 1916. Only two groups of operatives studied, male and female weavers in Maine, fail to show exclusively increasing earnings since 1913, and these exceptions are such as to be of negligible importance, the female weavers appearing to have received in 1914 only 4 cents per week less than in 1913, and the male weavers only 12 cents less.

TABLE XII

The Movement of Earnings in the Massachusetts Cotton Industry, 1890–1916

Year.	Nominal (Full Time) Hours per Week.	Card Strippers - Male.			Frame Spinners — Female.		
		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.	
			Absolute	Relative. (Base = $6.187)		Absolute.	Relative. (Base = $5.408)
1890	60	$.0999	$5.99	96.8	$.0911	$5.47	101.1
1891	60	.1035	6.21	100.4	.0894	5.36	99.1
1892	59**	.1057	6.24	100.9	.0912	5.38	99.5
1893	58	.1089	6.31	102.0	.0992	5.75	106.3
1894	58	.1065	6.18	99.9	.0892	5.17	95.6
1895	58	.1064	6.17	99.7	.0912	5.29	97.8
1896	58	.1086	6.30	101.8	.0967	5.61	103.7
1897	58	.1083	6.28	101.5	.0960	5.57	103.0
1898	58	.1074	6.23	100.7	.0916	5.31	98.2
1899	58	.1027	5.96	96.3	.0892	5.17	95.6
1900	58	.1183	6.86	110.9	.1041	6.04	111.7
1901	58	.1186	6.88	111.2	.1025	5.95	110.0
1902	58	.1186	6.88	111.2	.1028	5.96	110.2
1903	58	.1206	6.99	113.0	.1055*	6.12	113.2
1904	58	.1194*	6.93	112.0	.1028*	5.96	110.2
1905	58	.1196	6.94	112.2	.1055	6.12	113.2
1906	58	.1286*	7.46	120.6	.1221	7.08	130.9
1907	58	.1441*	8.36	135.1	.1307*	8.07	149.2
1908	58	.1325	7.69	124.3	.1322	7.67	141.8
1909	58	.1262	7.32	118.3	.1242	7.20	133.1
1910	56	.1283*	7.19	116.2	.1307*	7.32	135.3
1911	56	.1287*	7.21	116.5	.1314*	7.36	136.9
1912	54	.1437	7.76	125.4	.1449*	7.82	144.6
1913	54	.1489	8.04	130.0	.1490	8.05	148.9
1914	54	.151	8.15	131.7	.150	8.10	149.8
1915	No data						
1916	54	.188	10.15	164.1	.182	9.83	181.8

TABLE XII Continued. The Movement of Earnings in the Massachusetts Cotton Industry, 1890–1916

Year.	Nominal (Full Time) Hours Per Week.	Loom Fixers — Male.			Weavers — Female.			Weavers — Male.		
		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.	
			Absolute.	Relative. (Base=$10.668)		Absolute.	Relative. (Base = $7.151)		Absolute.	Relative. (Base = $7.885)
1890	60	$.1839	$11.03	103.4	$.1187	$7.12	99.6	$.1353	$8.12	103.0
1891	60	.1800	10.80	101.2	.1185	7.11	99.4	.1343	8.06	102.2
1892	59†	.1796	10.60	99.4	.1217	7.18	100.4	.1365	8.05	102.1
1893	58	.1913	11.09	104.0	.1315	7.63	106.7	.1459	8.46	107.3
1894	58	.1807	10.48	98.2	.1206	6.99	97.8	.1323	7.67	97.3
1895	58	.1724	9.99	93.6	.1187	6.88	96.2	.1266	7.34	93.1
1896	58	.1872	10.86	101.8	.1252	7.26	101.5	.1378	7.99	101.3
1897	58	.1871	10.85	101.7	.1233	7.15	100.0	.1370	7.94	100.7
1898	58	.1838	10.66	99.9	.1251	7.26	101.5	.1350	7.83	99.3
1899	58	.1780	10.32	96.7	.1195	6.93	96.9	.1274	7.39	93.7
1900	58	.2028	11.76	110.2	.1364	7.91	110.6	.1487	8.62	109.3
1901	58	.2033	11.79	110.5	.1371	7.95	111.2	.1497	8.68	110.1
1902	58	.2047	11.87	111.3	.1370	7.95	111.2	.1532	8.89	112.7
1903	58	.2118	12.28	115.1	.1411*	8.18	114.4	.1604*	9.30	118.0
1904	58	.2132*	12.37	115.9	.1428*	8.28	115.8	.1589*	9.22	116.9
1905	58	.2166	12.56	117.7	.1478	8.57	119.8	.1646	9.55	121.1
1906	58	.2296*	13.32	124.9	.1556*	9.02	126.1	.1733*	10.05	127.5
1907	58	.2554*	14.81	138.8	.1691*	9.81	137.2	.1901*	11.03	139.9
1908	58	.2419	14.03	131.5	.1634	9.48	132.6	.1843	10.69	135.6
1909	58	.2249	13.04	122.2	.1505	8.73	122.1	.1614	9.36	118.7
1910	56	.2292*	12.83	120.3	.1507*	8.44	118.0	.1628*	9.12	115.6
1911	56	.2305*	12.91	121.0	.1477*	8.27	115.6	.1637*	9.16	116.2
1912	54	.2592	14.00	131.2	.1668	9.01	126.0	.1797	9.70	123.0
1913	54	.2608	14.08	132.0	.1663	8.98	125.6	.1818	9.82	124.5
1914	54	.264	14.26	133.7	.168	9.07	126.8	.186	10.04	127.3
1915	No data									
1916	54	.312	16.85	157.9	.204	11.02	154.1	.220	11.88	150.7

* A simple average of two quotations covering different groups of establishments.

† The fifty-eight-hour law became operative July 1, 1892.

TABLE XIII

The Movement of Earnings in the Maine Cotton Industry, 1890–1916

Year.	Nominal (Full Time) Hours per Week.	Card Strippers — Male.			Frame Spinners — Female.		
		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.	
			Absolute.	Relative. (Base = $5.148)		Absolute.	Relative. (Base = $4.440)
1890	60	$.0830	$4.98	96.7	$.0775	$4.65	104.7
1891	60	.0833	5.00	97.1	.0805	4.83	108.8
1892	60	.0809	4.85	94.2	.0760	4.56	102.7
1893	60	.0883	5.30	103.0	.0798	4.79	107.9
1894	60	.0875	5.25	102.0	.0658	3.95	89.0
1895	60	.0828	4.97	96.5	.0704	4.22	95.0
1896	60	.0906	5.44	105.7	.0778	4.67	105.2
1897	60	.0973	5.84	113.4	.0737	4.42	99.6
1898	60	.0863	5.18	100.6	.0679	4.07	91.7
1899	60	.0779	4.67	90.7	.0707	4.24	95.5
1900	60	.0867	5.20	101.0	.0776	4.66	105.0
1901	60	.0920	5.52	107.2	.0813	4.88	109.9
1902	60	.0929	5.57	108.2	.0784	4.70	105.9
1903	60	.0943	5.66	110.0	.0757	4.54	102.3
1904	60	.1007*	6.04	117.3	.0934*	5.60	126.1
1905	60	.1130	6.78	131.7	.0941	5.65	127.3
1906	60	.1196	7.18	139.5	.1088	6.53	147.1
1907	60	.1304	7.82	151.9	.1199*	7.19	161.9
1908	60	.1204	7.22	140.2	.1054	6.32	142.3
1909	60	.1197	7.18	139.5	.1088	6.53	147.1
1910	58	.1216*	7.05	137.0	.1195*	6.93	156.1
1911	58	.1228*	7.12	138.3	.1189*	6.90	155.4
1912	58	.1312	7.61	147.8	.1330	7.71	173.7
1913	58	.1330	7.72	150.0	.1413	8.19	184.5
1914	58	.137	7.94	154.2	.142	8.24	185.6
1915	No data						
1916	58	.163	9.45	183.6	.17	9.86	222.1

TABLE XIII Continued. The Movement of Earnings in the Maine Cotton Industry, 1890–1916

Year.	Nominal (Full Time) Hours Per Week.	Loom Fixers — Male.			Weavers — Female.			Weavers — Male.		
		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.	
			Absolute.	Relative. (Base=$11.120)		Absolute.	Relative. (Base = $6.769)		Absolute.	Relative. (Base = $7.782)
1890	60	$.1876	$11.26	101.3	$.1114	$6.68	98.7	$.1221	$7.33	94.2
1891	60	.1882	11.29	101.5	.1110	6.66	98.4	.1278	7.67	98.6
1892	60	.1913	11.48	103.2	.1105	6.63	97.9	.1261	7.57	97.3
1893	60	.1889	11.33	101.9	.1098	6.59	97.4	.1358	8.15	104.7
1894	60	.1800	10.80	97.1	.1134	6.80	100.5	.1301	7.81	100.4
1895	60	.1794	10.76	96.8	.1116	6.70	99.0	.1280	7.68	98.7
1896	60	.1848	11.09	99.7	.1204	7.22	106.7	.1389	8.33	107.0
1897	60	.1910	11.46	103.1	.1181	7.09	104.7	.1339	8.01	102.9
1898	60	.1784	10.70	96.2	.1113	6.68	98.7	.1280	7.68	98.7
1899	60	.1829	11.03	99.2	.1106	6.64	98.1	.1265	7.59	97.5
1900	60	.2040	12.24	110.1	.1214	7.28	107.5	.1350	8.10	104.1
1901	60	.2042	12.25	110.2	.1303	7.82	115.5	.1565	9.39	120.7
1902	60	.2053	12.32	110.8	.1272	7.63	112.7	.1502	9.01	115.8
1903	60	.2020	12.12	109.0	.1255	7.53	112.2	.1439	8.63	110.9
1904	60	.2007*	12.05	108.4	.1251*	7.51	110.9	.1362*	8.17	105.0
1905	60	.1941*	11.65	104.8	.1348	8.09	119.5	.1581	9.49	122.0
1906	60	.2075	12.45	112.0	.1474	8.84	130.6	.1748	10.49	134.8
1907	60	.2304	13.82	124.3	.1614	9.68	143.0	.1922*	11.53	148.2
1908	60	.2110	12.66	113.9	.1490	8.94	132.1	.1742	10.45	134.3
1909	60	.2079	12.47	112.1	.1512	9.07	134.0	.1712	10.27	132.0
1910	58	.2109*	12.23	110.0	.1492*	8.65	127.8	.1715*	9.95	127.9
1911	58	.2156*	12.51	112.5	.1518*	8.80	130.0	.1780	10.32	132.6
1912	58	.2398	13.91	125.1	.1627	9.44	139.5	.1967	11.41	146.6
1913	58	.2407	13.96	125.5	.1668	9.67	142.9	.1990	11.54	148.3
1914	58	.258	14.96	134.5	.166	9.63	142.3	.197	11.42	146.8
1915	No data									
1916	58	.282	16.35	147.0	.204	11.83	174.8	.24	13.92	178.9

* A simple average of two quotations covering different groups of establishments.

TABLE XIV

The Movement of Earnings in the Rhode Island Cotton Industry, 1890–1916

Year.	Nominal (Full Time) Hours per Week.	Card Strippers — Male.			Frame Spinners — Female.		
		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.	
			Absolute.	Relative. (Base = $6.574)		Absolute.	Relative. (Base = $3.552)
1890	60	$.1120	$6.72	102.2	$.0530	$3.18	89.6
1891	60	.1109	6.65	101.2	.0525	3.15	88.7
1892	60	.1107	6.64	101.0	.0554	3.32	93.5
1893	60	.1130	6.78	103.1	.0609	3.65	102.8
1894	60	.1090	6.54	99.5	.0582	3.49	98.3
1895	60	.1109	6.65	101.2	.0593	3.56	100.3
1896	60	.1095	6.57	99.9	.0677	4.06	114.3
1897	60	.1100	6.60	100.4	.0631	3.79	106.7
1898	60	.1002	6.01	91.4	.0588	3.53	99.4
1899	60	.1097	6.58	100.1	.0631	3.79	106.7
1900	60	.1139	6.83	103.9	.0763	4.58	129.0
1901	60	.1137	6.82	103.7	.0726	4.36	122.8
1902	†58.5	.1334	7.80	118.7	.0939	5.49	154.6
1903	58	.1333	7.73	117.6	.0968*	5.61	158.0
1904	58	.1192	6.91	105.1	.0853	4.95	139.4
1905	58	.1258	7.30	111.1	.0983	5.70	160.5
1906	58	.1275	7.40	112.6	.1097	6.36	179.1
1907	58	.1494	8.67	131.9	.1347*	7.81	219.9
1908	58	.1387	8.04	122.3	.1248	7.24	203.9
1909	58	.1387	8.04	122.3	.1197	6.94	195.4
1910	56	.1386*	7.76	118.0	.1393*	7.80	219.7
1911	56	.1379	7.72	117.4	.1317	7.38	207.8
1912	56	.1493	8.36	127.2	.1208	6.76	190.3
1913	‡55	.1495	8.22	125.0	.1439	7.91	222.7
1914	54	.155	8.37	127.3	.151	8.15	229.4
1915	No data						
1916	54	.198	10.69	162.6	.190	10.26	288.9

TABLE XIV Continued. The Movement of Earnings in the Rhode Island Cotton Industry, 1890–1916

Year.	Nominal (Full Time) Hours per Week.	Loom Fixers — Male.			Weavers — Female.			Weavers — Male.		
		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.		Hourly Earnings	Nominal (Full Time) Weekly Earnings.		Hourly Earnings.	Nominal (Full Time) Weekly Earnings.	
			Absolute.	Relative. (Base=$10.480)		Absolute.	Relative. (Base = $7.543)		Absolute.	Relative. (Base = $8.354)
1890	60	$.1765	$10.59	101.0	$.1281	$7.69	101.9	$.1596	$9.58	114.7
1891	60	.1781	10.69	102.0	.1292	7.75	102.7	.1384	8.30	99.4
1892	60	.1793	10.76	102.7	.1272	7.63	101.2	.1407	8.44	101.0
1893	60	.1830	10.98	104.8	.1398	8.39	111.2	.1531	9.19	110.0
1894	60	.1691	10.15	96.9	.1252	7.51	99.6	.1362	8.17	97.8
1895	60	.1708	10.25	97.8	.1242	7.45	98.8	.1420	8.52	102.0
1896	60	.1738	10.43	99.5	.1268	7.61	100.9	.1390	8.34	99.8
1897	60	.1713	10.28	98.1	.1222	7.33	97.2	.1335	8.01	95.9
1898	60	.1663	9.98	95.2	.1152	6.91	91.6	.1191	7.15	85.6
1899	60	.1782	10.69	102.0	.1193	7.16	94.9	.1306	7.84	93.8
1900	60	.1981	11.89	113.5	.1310	7.86	104.2	.1512	9.07	108.6
1901	60	.1950	11.70	111.6	.1295	7.77	103.0	.1414	8.48	101.5
1902	58.5†	.2182	13.51	128.9	.1441	8.43	111.8	.1593	9.24	110.6
1903	58	.2160*	12.53	119.6	.1462	8.48	112.4	.1670*	9.69	116.0
1904	58	.2037	11.81	112.7	.1368	7.93	105.1	.1431	8.30	99.4
1905	58	.2062	11.96	114.1	.1355	7.86	104.2	.1475	8.55	102.3
1906	58	.2169	12.58	120.0	.1505	8.73	115.7	.1646	9.55	114.3
1907	58	.2540	14.73	140.6	.1693*	9.82	130.2	.1921*	11.14	133.4
1908	58	.2351	13.64	130.2	.1693	9.82	130.2	.1895	10.99	131.6
1909	56	.2361	13.69	130.6	.1655	9.60	127.3	.1869	10.84	129.8
1910	56	.2364*	13.24	126.3	.2166*	12.13	160.8	.1853*	10.38	124.3
1911	56	.2426	13.59	129.7	.1607	9.00	119.3	.1822	10.20	122.1
1912	56	.2652	14.85	141.7	.1705	9.55	126.6	.1917	10.74	128.6
1913	55‡	.2663	14.65	139.8	.1733	9.53	126.3	.1953	10.74	128.6
1914	54	.276	14.92	142.4	.181	9.76	129.4	.201	10.88	130.2
1915	No data									
1916	54	.332	17.91	170.9	.224	12.07	160.0	.245	13.24	158.5

* A simple average of two quotations covering different groups of establishments.

† The fifty-eight-hour law became operative April 4, 1902. ‡ The fifty-four-hour law became operative July 1, 1913.

CHART VI

The Movement of Full Time Earnings in the Massachusetts Cotton Industry, 1890–1916

Base (100) = averages of quotations for 1890–1899

———— Card strippers, male – – – – Frame spinners, female
.....•.....•..... Loom fixers, male —x—x— Weavers, female
...—...— Weavers, male

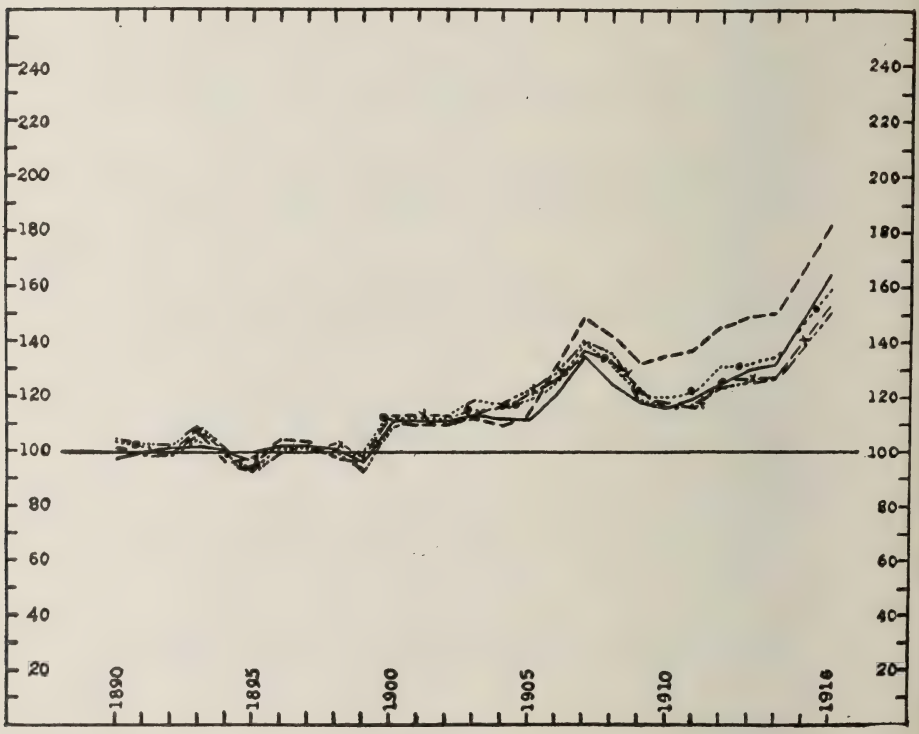


CHART VII

The Movement of Full Time Earnings in the Maine Cotton Industry, 1890–1916

Base (100) = averages of quotations for 1890–1899

———— Card strippers, male - - - - Frame spinners, female
·····●·····●·····Loom fixers, male —x—x— Weavers, female
···—···—··· Weavers, male

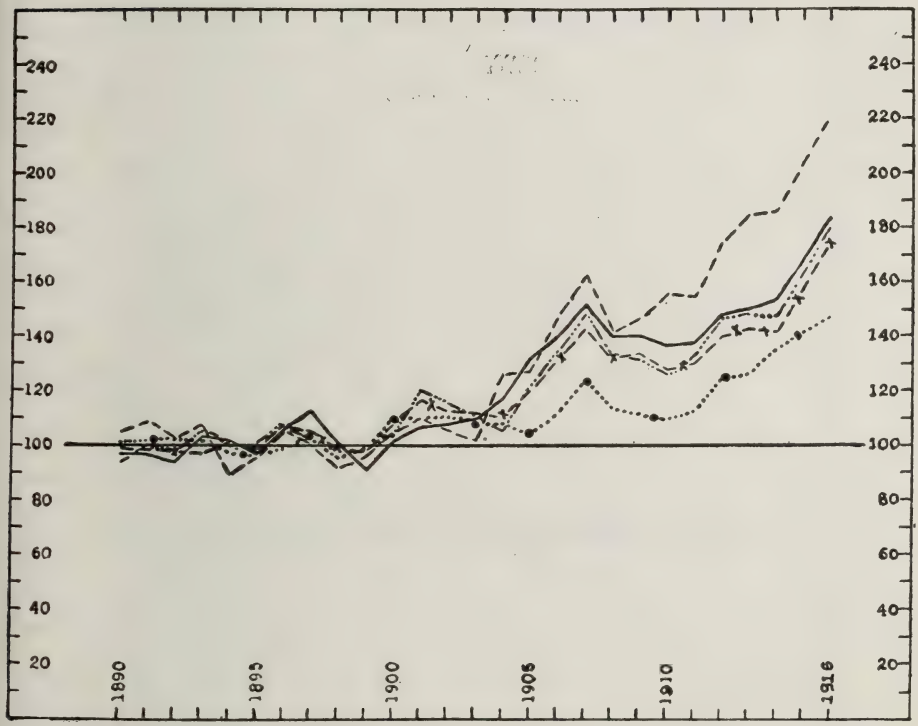
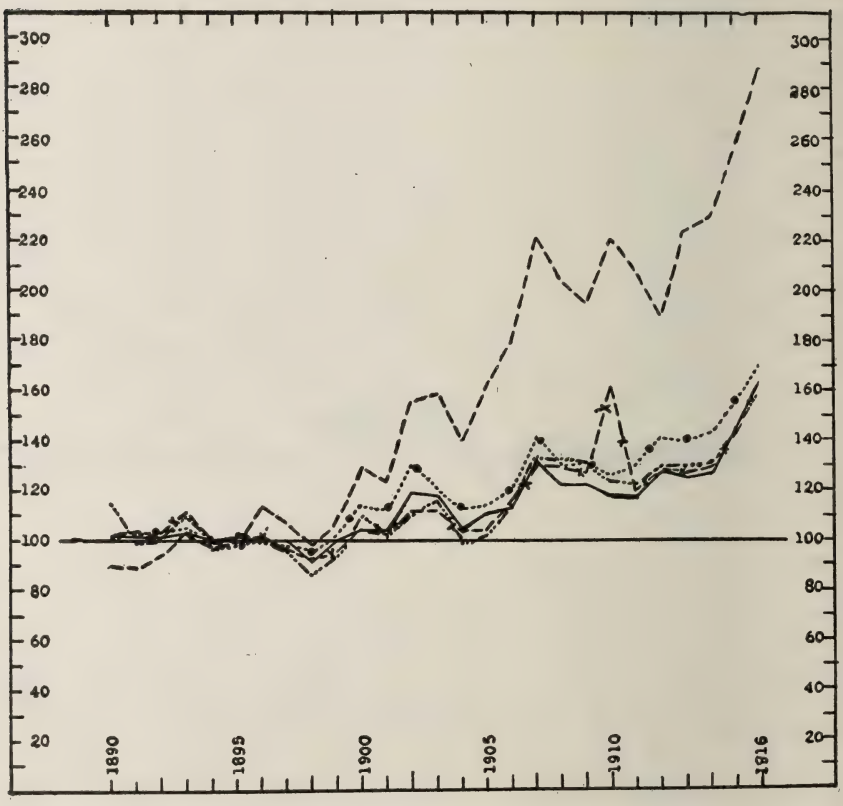


CHART VIII

The Movement of Full Time Earnings in the Rhode Island Cotton Industry, 1890–1916

Base (100) = averages of quotations for 1890–1899

———— Card strippers, male - - - - Frame spinners, female
.....●.....●..... Loom fixers, male —x—x— Weavers, female
...—...—... Weavers, male



If we examine separately the charts for Massachusetts, Maine and Rhode Island, it is apparent that in each of these states the movements of full time earnings in all of the occupational groups have been quite similar. However, the chart represent-

ing the conditions in the Massachusetts section of the industry exhibits by far the greatest amount of correlation between the different occupational series. From 1891 to 1907 this correlation is very marked, while after the latter year the only curve which diverges considerably from what may be called the normal course is that for female frame spinners. This divergence seems to be due to some change which occurred about 1907, placing the female frame spinners in that year at a level considerably higher relatively, than the other workers. The relative heights of the occupational series established in 1907 were maintained approximately through the remaining years of the period, the general direction of movement for frame spinners corresponding quite closely with the movements of earnings of the operative groups.

While it is true that the charts for Maine and Rhode Island show a greater scattering of the occupational earnings curves, and that there is apparent in these cases a much less amount of correlation between the occupational series of full time earnings quotations, it is nevertheless true that there is to be observed in each of these charts a common tendency of the wage movements of the occupational groups. In each of these cases, as in the Massachusetts case, it is the female frame spinners who appear to have departed from the path of common progress. On the whole the evidence presented by these charts seems to add to the plausibility of the theory that not only have changes of rates of wages at Fall River been shared equally by all the occupational groups in that city but such standardization has to a considerable degree come to pervade the whole industry, being most highly developed in Massachusetts, and much less developed in Maine and Rhode Island.

Aside from giving some indication as to the direction of changes of full time earnings and as to the standardization of wage movements as between occupational groups, the materials of Tables XII, XIII, and XIV throw some light on the relationship between legislation reducing the hours of labor and the earnings of the operatives. First, let us examine in some detail the effects of legislation in Massachusetts reducing the

hours of labor per week for women and minors from sixty to fifty-eight, from fifty-eight to fifty-six, and from fifty-six to fifty-four.

In 1891 card strippers at an average hourly earning of $.1035, working sixty hours per week, received $6.21 for the week's work. Working an average week of fifty-nine hours the following year at an hourly earning of $.1057 the weekly pay envelope showed a gain of $.03, while the next year, the first in which the fifty-eight hour week prevailed exclusively, with an hourly earning of $.1089 the weekly earnings reached $6.31. But declining hourly earnings in 1894 and 1895 reduced the weekly amounts below the level of 1891 and not until 1900 did the amount of the weekly earnings rise to the level of 1891 not to fall back again during the period of our study. Similarly the year 1900 marks the permanent establishment of weekly earnings at or above the level of weekly earnings prevailing in 1891 for each of the other occupational groups studied. Of course such a long period of readjustment reflects the uncertain trade conditions and changing piece rates of the decade, and it is probable that this long period of fluctuating weekly earnings is not representative of the normal effects of legislation decreasing the hours of labor.

Again taking the Massachusetts card strippers for an example, note the effects of the fifty-eight and fifty-six hour laws which became operative January 1, 1910 and January 1, 1912, respectively. In 1909 at an hourly earning of $.1262, working fifty-eight hours, these men earned $7.32 per week. In both 1910 and 1911 the hourly earnings were greater than in 1909, but not sufficiently so to compensate for the reduction of hours to fifty-six, so that in these years the weekly earnings were less than in 1909. When the fifty-four hour law went into force labor agitation throughout Massachusetts, of which the strike at Lawrence was the most violent and determining, caused advances of wages which brought increases of hourly earnings sufficient to raise the weekly earnings above the level of 1909. What happened in the case of the card strippers happened also in the cases of the other workers with the excep-

tion of the female frame spinners, whose peculiar position since 1907 we have already noted. Their hourly earnings in 1910 and 1911 were so considerably greater than in 1909 as to counteract the influence of the restrictive legislation.

A similar result followed the restriction of the hours of labor in Maine in 1910. All that has just been stated to have happened in Massachusetts with regard to the course of weekly earnings happened in Maine, except that the loom fixers and the male weavers recovered their earning powers under the new conditions by 1911.

An examination along the same lines of the conditions of the operatives in Rhode Island shows that the legislation of 1902 caused no unfavorable movement of the curve of weekly earnings as compared with the level of 1901, with the exception that the male weavers appear from the table to have received in 1904 less per week than in 1901. But it is doubtful whether this item in the table shows a result of labor legislation. Rather it appears that the marked but temporary decrease of weekly earnings was due to a similar decrease of the hourly earnings. In explanation of the general rise of weekly earnings following reduction of hours is suggested the marked increase of the hourly earnings which began in 1902 and which is probably a reflection of the changes of rates which are known to have occurred in 1902, if we assume the Fall River conditions to be typical of the industry. This assumption is the more reasonable in view of the proximity of the Rhode Island mills to Fall River. This reduction of hours in Rhode Island occurred at a time most favorable to assuring beneficial results to the workers. The uncertain conditions of the panic of 1893, the depression of 1894 and 1895, the political campaign of 1896, and the war conditions of 1898 were at an end and business in general was on the road to prosperity.

The Rhode Island legislation of 1909 which took effect in January, 1910, caused changes in the weekly earnings remarkably similar to those caused by the contemporary reductions of hours in Massachusetts and Maine. The female frame spinners suffered no reduction of weekly earnings, the card

strippers and loom fixers did not receive weekly earnings equal to those of 1909 until 1912, while the male weavers did not experience a restoration of earnings until 1914, the fifty-four hour law becoming effective in the meantime. The female weavers, according to the table, received a marked advance of weekly pay in 1910, but it is doubtful if the figures for this year are typical of conditions in the industry. The hourly earnings reported by overlapping bulletins of the Bureau of Labor were $.1950 and $.2382, of which the average, used in the present tables, is $.2166. Even the lower figure of the original exhibits would give a weekly earning of $10.92, an amount greater than that received in any other year preceding. If, then, we ignore the figures for 1910, the female weavers, like the male weavers, had to wait until 1914 for a restoration of their earnings to the level of 1909. The legislation of 1913 appears to have affected the weekly earnings of the different occupational groups in no uniform manner.

In the preceding parts of this study of the movement of full time earnings the attempt has been made to ascertain the facts relating to the operative force as a whole or to certain sex or occupational groups. Wage movements have been represented graphically as line movements, the assumption being that changes of rates of wages have affected all mill employees in a substantially uniform measure. Such an analysis as the foregoing, in so far as it must be based upon data of a somewhat fragmentary nature, can be well supplemented by the study of the distribution of workers in different wage groups. The data available for such a study are unusually abundant and adequate.

For the period since and including 1889 the Massachusetts Bureau of Statistics has collected from manufacturers throughout that state returns of a very complete and detailed nature, showing among other facts the wage classification at a certain time of each year of all their employees other than clerks and salaried officers. For the purpose of the present study these published summaries relating to the cotton manufacturing industry have been rearranged to secure uniformity in the groupings throughout the entire period, and all absolute figures

have been converted into percentage figures, so that there might be made a comparison of the distribution of employees from year to year. The results of this work of revision and analysis are presented in Table XV and Chart IX.[1]

1. For the years from 1889 to 1905 for the materials of this table, and for the years from 1886 to 1905 for the materials of Tables XVI, XVII, and XVIII in Chapter V, double reports were prepared by the Massachusetts Bureau of Statistics. The nature of these double reports should be explained here once for all, but can be done best by reference to Table XVII. If the reader will turn to this table he will observe that the Massachusetts Statistics of Manufactures dated 1894 contained data for 148 cotton manufacturing establishments which replied to the inquiries of the Bureau of Statistics for information regarding conditions in both 1893 and 1894. In 1895 nine more establishments than in the preceding year gave information concerning conditions in 1894 and 1895. Thus there are two reports for 1894, the one covering 148 establishments, and the other 157 establishments. In no cases have there been found serious discrepancies between the reports covering any one year. In Table XV for the years for which double reports exist averages of these figures are shown.

The report on the Statistics of Manufactures for the year 1909 does not give any information regarding the distribution of employees in wage groups.

TABLE XV

The Percentage Distribution of Employees in the Massachusetts Cotton Industry, on the Basis of Weekly Earnings, 1889–1916

Year.	Under $5.00.	$5.00 but under $6.00.	$6.00 but under $7.00.	$7.00 but under $8.00.	$8.00 but under $9.00.	$9.00 but under $10.00.	$10.00 but under $12.00.	$12.00 but under $15.00.	$15.00 but under $20.00.	$20.00 and over.
1889	27.06	15.85	19.38	12.22	7.97	7.33	5.33	3.04	1.12	0.70
1890	26.69	15.46	18.69	12.49	8.24	7.51	5.93	3.18	1.17	0.67
1891	25.66	15.14	18.51	12.44	9.71	7.53	5.88	3.22	1.22	0.71
1892	23.44	14.76	18.58	13.25	9.07	7.96	7.01	3.92	1.33	0.71
1893	22.65	14.55	18.60	12.70	10.35	7.92	7.28	3.85	1.44	0.68
1894	26.94	17.15	18.26	13.48	9.57	5.42	5.19	2.30	1.05	0.68
1895	23.56	16.41	18.13	14.03	11.12	6.13	5.81	2.79	1.27	0.74
1896	23.49	16.15	18.16	14.33	11.48	5.87	5.74	2.79	1.24	0.75
1897	23.63	16.38	18.28	13.82	11.36	6.04	5.56	3.06	1.19	0.72
1898	26.64	17.72	18.03	14.18	9.58	4.94	4.77	2.48	1.01	0.69
1899	22.79	15.78	18.13	14.09	10.76	7.17	5.78	3.37	1.41	0.75
1900	18.62	14.12	17.88	14.22	11.14	10.02	7.19	4.35	1.69	0.80
1901	17.72	14.01	18.16	14.68	11.52	9.66	7.35	4.50	1.61	0.82
1902	15.82	12.73	16.78	14.73	11.24	9.75	10.88	5.23	2.06	0.80
1903	14.70	12.89	17.05	15.11	11.98	10.37	9.48	5.53	2.01	0.90
1904	15.55	13.30	17.74	16.16	12.27	9.41	8.59	4.80	1.64	0.57
1905	13.88	13.25	18.14	16.75	11.92	9.07	9.34	4.84	1.96	0.87
1906	9.82	10.71	15.91	16.50	14.25	10.71	12.56	6.42	2.17	0.95
1907	6.76	8.37	12.27	14.94	13.94	12.20	16.08	10.40	3.79	1.25
1908	7.66	9.27	14.40	16.34	14.19	12.12	14.30	7.46	3.03	1.23
1909										
1910	7.42	10.10	15.26	17.98	14.94	11.83	12.14	7.05	2.21	1.07
1911	6.61	10.17	15.09	17.85	14.68	12.28	12.61	7.13	2.51	1.07
1912	4.33	7.30	11.85	17.15	16.45	13.10	15.50	9.04	4.11	1.17
1913	3.72	5.74	10.34	16.13	16.45	13.51	17.56	10.91	4.37	1.27
1914	2.49	4.89	10.20	15.86	16.48	13.74	17.56	12.22	5.22	1.35
1915	2.00	4.04	8.94	15.39	17.30	14.52	18.78	12.72	4.95	1.36
1916	.67	1.69	3.40	6.29	9.18	11.61	25.41	24.99	13.40	3.36

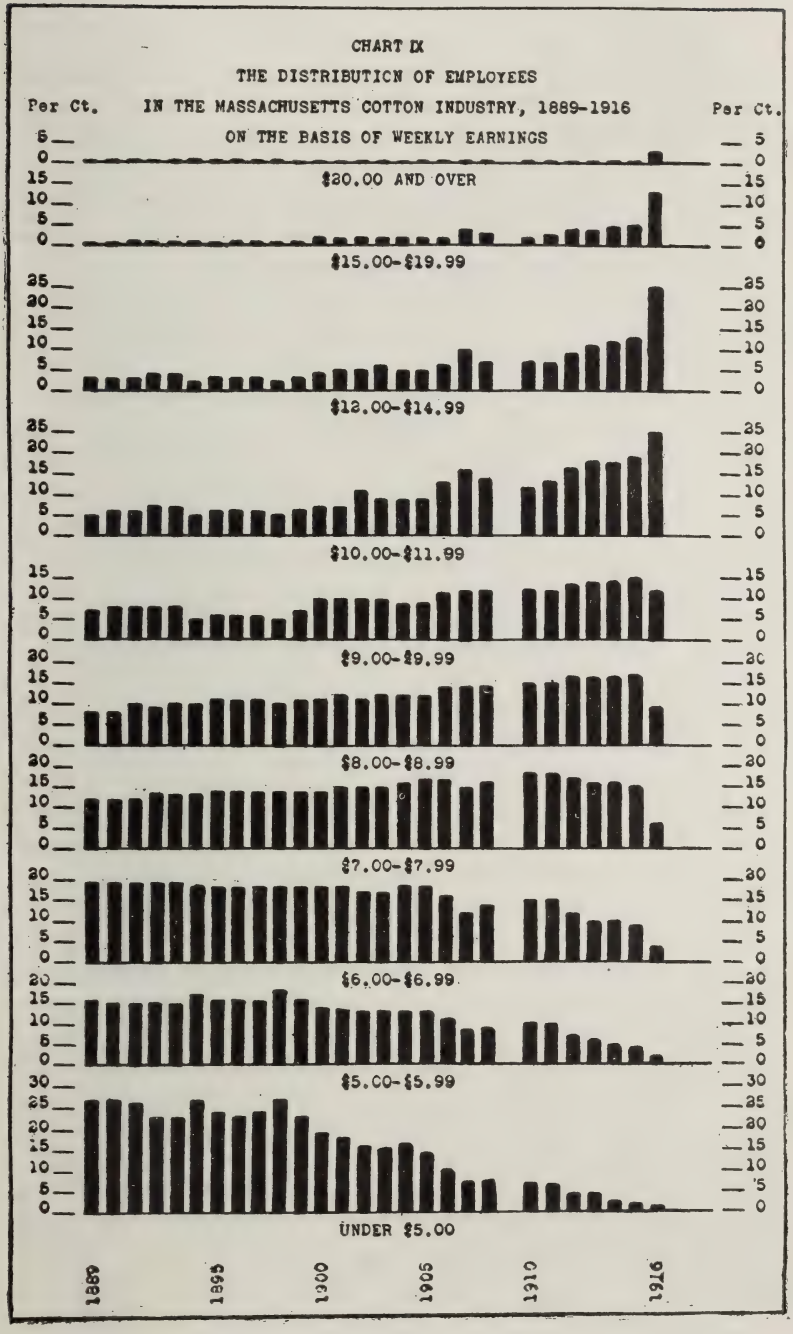


CHART IX
THE DISTRIBUTION OF EMPLOYEES
IN THE MASSACHUSETTS COTTON INDUSTRY, 1889-1916
ON THE BASIS OF WEEKLY EARNINGS
Per Ct.
Per Ct.
$20.00 AND OVER
$15.00-$19.99
$12.00-$14.99
$10.00-$11.99
$9.00-$9.99
$8.00-$8.99
$7.00-$7.99
$6.00-$6.99
$5.00-$5.99
UNDER $5.00
1889
1895
1900
1905
1910
1916

In Chart IX there is strong corroborative evidence of the upward movement of full time earnings which has appeared in the tables and charts presented heretofore. While in 1889 about 27 per cent of the cotton textile operatives in Massachusetts received at the date of the filing of the returns less than $5 per week, in 1916 the same wage group composed less than 1 per cent of the operative force. And, to illustrate by reference to one of the wage groups higher in the scale, those receiving between $15.00 and $19.99 per week grew from being slightly over 1 per cent of the whole force in 1889 to over 13 per cent in 1916.

It is interesting to note the general trend of the perpendicular blocks representing the several groups at different dates. The three lowest groups with almost entire consistency throughout the period studied show steadily decreasing relative numbers (that is, percentage composition of the whole group of workers). While the seven remaining groups show fairly consistent and steady growth for nearly all of the period. In the groups which include operatives receiving weekly wages of $7.00 to $9.99 there is clearly apparent the effect of the upward trend of wages under war conditions, since in these latest years of the period the tendency of the size of these groups is markedly downward. Note carefully that the increases and decreases in size of these middle groups are by no means as pronounced as those of the groups at either extreme. Evidently there has been no very great difference in the degrees of rapidity with which workers of all classes have shifted from one group to the next higher. What appears here is valuable as throwing light upon the assumption of approximately equal distribution among the workers of gains and losses resulting from wage advances and reductions. If there appears here anything in modification of this general assumption, it is that in periods of marked upward changes of rates, those who have been the lower paid have received the greater real gains, a phenomenon which has appeared in the chapter analyzing changes of earnings between 1860 and 1890. At any rate, all the materials studied evidence quite strongly a marked and rather steady increase of full time money earnings in the Massachusetts section of the cotton manufacturing industry since 1890.

CHAPTER V

FLUCTUATIONS OF EMPLOYMENT

In the immediately preceding chapters dealing with the movement of full time earnings there has been a tacit, necessary and temporary assumption that the wage quotations of the original exhibits used have been at least approximately representative of conditions in the several years of the periods studied. In the use of the available materials there has been no systematic or deliberate attempt to make allowance for fluctuations of employment, and it is to the facts concerning this aspect of the wage situation that we next turn. Clearly it is a matter of considerable concern to the cotton mill employee that not only shall the rate of wages per piece or per hour be satisfactory, but also that he shall receive his wage with some degree of regularity from season to season and from year to year.

So far as concerns the effects of unemployment upon wages and their movements, our problem has two phases: first, that which concerns any fairly regular seasonal fluctuations that may exist, and, second, that which concerns the extent of conditions of unemployment at whatever times and with whatever regularity or irregularity they may occur.

For the study of the first phase of the unemployment problem in the cotton manufacturing industry, the best single source of information consists of the series of reports of the Massachusetts Bureau of Statistics on the Statistics of Manufactures, especially that part of each volume of this series which indicates the numbers of workers reported as employed each month by the establishments covered. For example, in the report for 1916, returns from 170 cotton manufacturing establishments showed an average number of employees for the year of 114,800, the monthly figures ranging from 113,000 in August

to 116,600 in November. In order to make comparative use of these and similar figures covering other years, the absolute monthly and annual average figures have been converted into

TABLE XVI

Fluctuations of Employment in the Massachusetts Cotton Industry, 1889–1916

The per cents. which the monthly rolls of employees were of the average for each year.[1]

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1889	99.5	99.8	98.5	100.0	100.1	100.0	100.0	100.1	100.1	100.5	100.6	100.6
1890	99.3	100.1	99.3	100.3	100.0	100.0	98.8	99.2	100.0	100.7	100.9	100.9
1891	100.5	100.5	100.4	100.0	99.5	99.4	99.4	99.1	99.4	100.3	100.8	100.8
1892	98.9	100.3	100.4	100.7	100.5	99.8	99.4	99.3	99.6	99.8	101.2	100.8
1893	101.9	103.1	102.9	104.3	104.4	103.9	103.6	89.0	81.0	98.7	100.0	99.4
1894	105.2	105.0	104.2	103.7	103.5	103.1	98.1	86.9	79.3	99.5	105.6	106.7
1895	100.4	100.4	100.8	100.7	100.6	100.4	98.1	97.4	99.5	99.6	101.1	101.1
1896	103.0	103.8	104.3	103.0	102.7	102.0	96.3	86.1	92.1	100.7	102.4	104.3
1897	103.4	100.0	101.0	101.0	101.5	99.8	96.3	90.5	100.9	102.2	102.5	101.4
1898	98.9	93.1	94.4	98.4	99.8	102.1	100.9	100.9	101.1	103.7	103.3	104.0
1899	99.0	99.2	99.8	100.7	100.0	100.0	99.8	99.0	100.1	99.6	101.0	102.4
1900	99.8	100.3	101.6	100.6	100.5	101.0	99.6	97.5	97.8	99.6	100.7	101.3
1901	101.9	101.8	101.9	95.4	98.0	98.3	97.0	98.6	99.0	100.4	104.2	103.5
1902	99.8	99.7	101.4	100.0	101.2	99.6	99.0	99.0	98.7	100.6	101.7	100.7
1903	104.2	104.8	103.9	92.0	91.4	100.2	99.7	98.1	97.9	102.4	102.8	102.7
1904	108.1	108.1	107.8	106.9	105.5	102.8	99.2	84.1	84.2	94.3	97.9	101.5
1905	97.3	99.9	100.8	102.1	101.8	101.4	101.2	101.2	101.8	96.1	97.7	99.4
1906	99.9	100.1	100.5	100.1	100.0	99.8	99.5	98.7	99.1	100.5	101.4	100.4
1907	99.6	100.0	100.5	100.2	100.2	100.2	100.0	99.0	100.2	100.8	100.4	98.4
1908	101.4	99.3	96.2	90.9	91.0	99.3	95.4	96.2	101.2	108.0	110.1	110.6
1909	97.9	98.4	99.7	99.7	99.9	99.6	100.3	100.0	101.2	100.7	100.7	101.7
1910	101.7	101.7	100.9	100.6	100.8	100.2	95.6	96.4	97.4	101.4	102.4	102.8
1911	102.3	101.8	102.6	102.4	100.6	97.5	97.0	94.1	95.2	101.1	102.4	103.1
1912	99.5	98.7	100.4	96.1	101.4	101.5	98.5	94.3	99.9	102.5	103.7	104.1
1913	101.8	101.8	102.4	101.6	99.1	97.1	96.7	94.9	99.9	101.1	101.8	101.8
1914	104.4	103.7	103.4	103.2	101.7	100.4	98.2	95.9	96.4	97.2	97.9	97.4
1915	96.7	97.8	99.3	99.7	99.6	100.1	99.6	99.0	99.6	102.2	103.1	103.1
1916	100.1	100.2	100.6	100.2	99.9	99.6	98.6	98.4	99.0	100.2	101.5	101.6
Average for 28 years	101.0	100.8	101.1	100.2	100.1	100.3	98.8	96.2	97.2	100.5	101.8	102.0

1. As in the case of Table XV the figures presented are average figures wherever two reports were published covering one year. The smallest base (100 per cent.) is that for 1889 when the average number of employees for the year as reported in 1889 for 136 establishments was 65,400; as reported in 1890, for 1889, for 157 establishments was 68,700. The largest base was 114,900 employees representing 167 establishments in 1913.

relative or percentage figures, the base (100) for each year being the average number of employees reported by all the establishments for that year. The results of this process of conversion are presented in detail in Table XVI. A graphic representation of the course of employment in the Massachusetts cotton manufacturing industry from 1889 to 1916, using

TABLE XVII

Unemployment in the Massachusetts Cotton Industry, 1886–1916

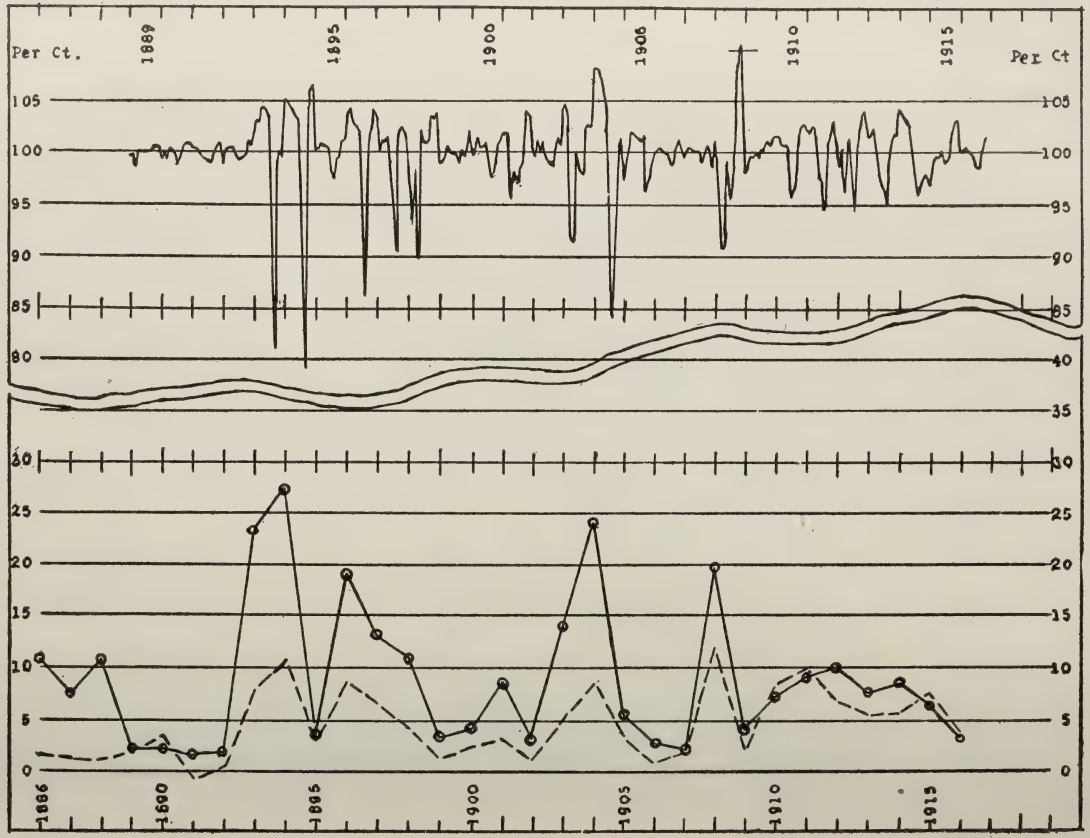
The Deviation from the Monthly Average Number of Employees

(From the Massachusetts Statistics of Manufactures and Table XVI of this monograph)

Year.	Per cent. which lowest monthly roll is of the average.	Per cent. which highest roll is of the average.	Per cent. which difference between these is of the average.
1886	93.3	104.5	10.7
1887	96.1	103.6	7.5
1888	93.1	103.8	10.7
1889	98.5	100.6	2.1
1890	98.8	100.9	2.1
1891	99.1	100.8	1.7
1892	98.9	100.8	1.9
1893	81.0	104.4	23.4
1894	79.3	106.7	27.4
1895	97.4	101.1	3.7
1896	86.1	104.3	18.2
1897	90.5	103.4	12.9
1898	93.1	104.0	10.9
1899	99.0	102.4	3.4
1900	97.5	101.7	4.2
1901	95.4	104.2	8.8
1902	98.7	101.7	3.0
1903	91.4	104.8	13.4
1904	84.1	108.1	24.0
1905	96.1	101.8	5.7
1906	98.7	101.4	2.7
1907	98.4	100.8	2.4
1908	90.9	110.6	19.7
1909	97.9	101.7	3.8
1910	95.6	102.8	7.2
1911	94.1	103.1	9.0
1912	94.3	104.1	9.8
1913	94.9	102.4	7.5
1914	95.9	104.4	8.5
1915	96.7	103.1	6.4
1916	98.4	101.6	3.2

CHART X

Fluctuations of Employment in the Massachusetts Cotton Industry, 1886–1916



———The deviation of the monthly rolls of employees from the averages of the rolls for the several years. The base (100) is a moving one, being for each year the average roll for that year.

———●———The annual maximum range of employment. The distance of each circle above the zero line equals the perpendicular distance between the maximum and minimum points in the solid line curve for that year. The per cent. indicated is that which the operatives employed at any time but also unemployed at any time in each year formed of the average number employed in that year.

this method of a changing base, is given in the upper portion of the truncated Chart X.

The fact which appears most clearly in the table and in the portion of Chart X referred to is that in the Massachusetts section of the industry there has been little seasonal swing of employment. The only approximation to such a swing is the slight tendency toward curtailment of production in July and August when the mills are waiting for the marketing of the new crop of raw cotton and are apt to proceed cautiously in their buying operations. We may, therefore, omit further consideration of this phase of the unemployment problem, and devote attention to the second phase, that of measuring the unemployment that has occurred irregularly and at times on a very considerable scale.

There are two methods of making such a measurement. The one uses the statistical data just described and is in terms of of variations within each year of the numbers of operatives on the pay rolls of the reporting mills. The other is in terms of the operating time of the mills. Let us first give attention to the former.

Referring again to Table XVI and to the upper portion of Chart X and also to Table XVII, it appears that in 1916 the total deviation of the operative force from the average of the monthly figures constituted 3.2 per cent. of this average. That is to say, in 1916 the number of cotton mill operatives who at any date covered by the monthly figures were unemployed constituted 3.2 per cent. of the average number of individuals employed in the industry that year. Applying the same method of computation to the available statistical information for the other years of the period 1886–1916, we have the figures of the last column of Table XVII and on Chart X the solid line curve of the portion below the lines of truncation. On this curve the locations of the circles indicate for the several years the total deviation from the average of employment. To connect in meaning the upper and lower portions of Chart X, the perpendicular distance from any one of the circles on the solid line curve of the lower portion of the chart to the zero

line equals the perpendicular distance from the lowest point in the upper curve to the highest point in the same curve for the year in question.

By this method of computing the fluctuations of conditions of unemployment it appears that in the period of thirty-one years covered by Table XVII the average deviation from the normal amount of employment per year has been 8.9 per cent. But since the distribution of this idleness has been so uneven in point of time, this average figure has little significance. Certain years, as 1886, 1888, 1893, 1894, 1896–1898, 1903, 1904 and 1908, stand out preeminently as years of unusual hardship, the deviation being in each of these years at least 10 per cent, and going well over 20 per cent. in 1893, 1894, and 1904 (the last named being a strike year).

But it must be emphasized that the estimate just made is in terms of one dimension; that is, in terms of the numbers of persons on the pay rolls at different times. In this estimate there is no allowance made for a second dimension which concerns the duration of unemployment.

For this phase of the problem again the best available information is that of the Massachusetts Statistics of Manufactures, which show the average operating time of all the establishments reporting each year. By converting the information contained in these reports, whether originally given in terms of days or of weeks, to percentage figures, considering the normal working year to consist of 51 weeks of 6 days, or 306 days, it is possible to make a comparative analysis of the idle time of the mills in successive years. The results of this process of conversion are shown in Table XVIII and by the broken or dash curve of the lower portion of Chart X.

It appears that the average amount of idle time per year for the period under study was slightly less than 4.5 per cent. of the normal working year. By this method of calculation, it seems, the hardships of unemployment are minimized. But it is quite significant that with respect to relative conditions prevailing in different years there is substantial agreement of the results of the two methods of unemployment measurement.

The years in which the greatest idleness existed as shown by the first calculation are likewise the years of greatest idleness as shown by the second.

Beyond this point in the analysis it is unsafe to proceed. There is not available the material which would make possible

TABLE XVIII

Unemployment in the Massachusetts Cotton Industry, 1886–1916

The Operating Time of the Mills

(From the Massachusetts Statistics of Manufactures)

Year.	Time in Operation. (Days)	Per cent. of Working Year in Operation.	Per Cent. of Working Year Idle.
1886	301.56	98.55	1.45
1887	302.34	98.80	1.20
1888	302.64	98.90	1.10
1889	300.13	98.09	1.91
1890	296.62	96.94	3.06
1891	308.49	100.80	—0.80
1892	304.83	99.62	0.38
1893	281.99	92.15	7.85
1894	272.91	89.19	10.81
1895	297.15	97.11	2.89
1896	279.73	91.41	8.59
1897	285.83	93.41	6.59
1898	293.05	95.76	4.24
1899	302.02	98.70	1.30
1900	299.06	97.73	2.27
1901	296.66	96.95	3.05
1902	302.66	98.91	1.09
1903	290.49	94.94	5.06
1904	280.08	91.53	8.47
1905	295.46	96.56	3.44
1906	303.56	99.20	0.80
1907	300.62	98.24	1.76
1908	269.62	88.11	11.89
1909	299.50	97.88	2.12
1910	280.80	91.76	8.24
1911	275.7	90.10	9.90
1912	284.9	93.10	6.90
1913	289.5	94.61	5.39
1914	288.5	94.28	5.72
1915	282.8	92.42	7.58
1916	294.3	96.18	3.82

The figures for the years 1887–1905 are averages of double returns. See the notes accompanying Tables XV and XVI.

in this case a more exact estimation of the extent of unemployment and of its effects upon the earnings of operatives. For it must be remembered that the two phases of the problem indicated by the two methods of measurement used above are not mutually exclusive. There is no clear separation in the returns published by the Massachusetts Bureau of Statistics of the results of the different methods of production curtailment — short time operation of whole establishments with no discharge of operatives, and partial discharge of the operative force. It is possible that the greater proximity to each other of the curves in the lower portion of Chart X in the later years of the period than in the earlier years is indicative of a growing custom of systematic curtailment of production, when such curtailment is necessary, by part time operation with few discharges of employees. On this point there is avaible no conclusive evidence.

No attempt is made, therefore, in view of the nature of the information available, to compute a series of discounts to be applied to the figures showing relative full time earnings with a view to finding exact relative actual earnings. The significant facts which it is intended that the materials of this chapter shall emphasize are, first, that unemployment in the cotton manufacturing industry has been to no considerable extent regular and seasonal and thus possible of anticipation by prudent workers, and second, that when unemployment has come thus irregularly it has been, at times, on a scale so great as to affect very seriously the yearly earnings of the employees.

CHAPTER VI

CONCLUSIONS

By way of conclusion there remains a three-fold task: first, to piece together the information relating to the movement of full time earnings in the different historical periods separately studied, thereby to construct one curve of wage movement for the entire period since 1860; second, to compare this movement of earnings with changes in general prices, in order to form an opinion as to the changes of real as opposed to money earnings; and third, to compare changes of rates of wages with the changes of full time earnings, to see whether changes in manufacturing technique have exerted a favorable or unfavorable influence upon operatives' earnings.

First comes the task of constructing a single curve representative of the movement of full time earnings since 1860. Because of the nature of the statistical materials available for study such a summary curve must relate only to the changes of conditions in the Massachusetts section of the cotton manufacturing industry. So that the task in hand is to connect the Mitchell series of relative earnings in Masschusetts mills for the years 1860–1880, the series constructed in the present study from the original exhibits of the Aldrich Report for the years 1880–1891 (both of these presented and discussed in Chapter III), and some single series summarizing the five occupational series of the Bureau of Labor Statistics for 1890–1916 (presented and discussed in Chapter IV).

The first connection is a simple one to make. As shown above in Chapter III, the application of the same statistical methods to the data of the 135 occupational series of the Aldrich Report used by Professor Mitchell and to the 74 occupational series studied for the years 1880–1891 gives nearly

identical results for the overlapping year 1880 — namely, weighted average relative wages of 153 and 155 respectively. The simplest and at the same time probably the most satisfactory method of connecting these two curves appears to be to call the quotation for the year 1880, 154, and to leave unchanged all other relatives of the two series. The element of possible error involved is small and is probably no greater than would enter into a more elaborate computation.

As a preliminary step to the making of the second connection, that of the series just completed from 1860 to 1891 with the material covering the years 1890–1916, it is necessary to reduce the occupational series constructed from the Bureau of Labor Statistics data for Massachusetts to one summary series. This has been done by taking a simple average for each year of the period of the five occupational quotations of relative full time earnings. The series composed of these average figures is, in view of the close correlation of the occupational series, serviceable as a summary of changes in the Massachusetts mills. It is presented in column (6) of Table XIX.

The conversion of this series into a similar series continuing the one just completed to 1891, using 1860 as the base(100), has been accomplished by the application of a formula of proportion—a method which, while not quite as accurate as would be an entire reworking of the quotations in the original returns made by the agents of the Bureau of Labor Statistics, is sufficiently accurate for summary purposes. The formula used is as follows:

> x (the relative wage for any year in the new series continuing the old series for 1860-1891 : the corresponding relative wage of the old series for 1890-1916 = 172 (the relative wage for 1891 of the old series for 1860-1891) : 100.4 (the relative wage for 1891 of the old series for 1890-1916).

The figures of the new continuous series of relative full time earnings for the entire period 1860–1916, using 1860 as the base, are presented in columns (2) and (7) of Table XIX, and the curve based on these quotations is plotted as a solid line on Chart XI.

TABLE XIX

Wages in the Massachusetts Cotton Manufacturing Industry and General Prices, 1860–1918

(1) Years.	(2) Relative Full Time Earnings†	(3) Relative Wholesale Prices of Commodities in General.	(4) Relative Weaving Rates at Fall River.	(5) Years.	(6) Relative Full Time Earnings*	(7) Relative Full Time Earnings†	(8) Relative Wholesale Prices of Commodities in General.	(9) Relative Weaving Rates at Fall River.
1860	101	100.0		1890	100.8	172.7	80.1	134.8
1861	97	97.7		1891	100.4	172.0	79.2	134.8
1862	98	115.7		1892	100.4	172.0	75.3	137.6
1863	108	159.4		1893	105.2	180.2	74.9	142.1
1864	127	225.2		1894	97.8	167.5	68.2	123.1
1865	140	207.3		1895	96.1	164.6	66.4	123.3
1866	161	184.6		1896	102.0	174.7	64.1	127.7
1867	167	165.3		1897	101.4	173.7	63.6	127.7
1868	165	161.4		1898	99.9	171.2	66.2	113.5
1869	169	157.2		1899	95.8	164.1	72.1	126.2
1870	166	140.1		1900	110.5	189.3	78.4	140.5
1871	177	130.0		1901	110.6	189.5	77.0	140.5
1872	183	134.7		1902	111.3	190.7	80.1	151.5
1873	178	134.0		1903	114.7	196.5	80.6	152.9
1874	163	128.0		1904	114.2	195.7	80.1	131.6
1875	150	119.8		1905	116.8	200.1	82.2	124.4
1876	145	111.1		1906	126.0	215.9	86.9	137.6
1877	142	108.4		1907	140.0	239.8	91.9	163.8
1878	145	97.9		1908	133.2	228.2	87.1	151.8
1879	144	93.9		1909	122.9	210.5	89.7	139.5
1880	154	104.6		1910	122.1	209.2	93.3	139.5
1881	149	101.6	149.0‡	1911	121.0	207.3	91.6	139.5
1882	157	103.2	149.0	1912	130.0	222.7	94·8	150.1
1883	158	97.6	149.0	1913	132.2	226.5	95.9	153.4
1884	155	88.9	132.8	1914	133.9	229.4	94.9	153.4
1885	150	82.1	119.1	1915			95.9	153.4
1886	153	80.5	126.9	1916	161.7	276.9	118.0	172.8
1887	160	81.1	128.8	1917			167.8	208.3
1888	164	83.6	134.1	1918				262.2
1889	169	80.6	134.8					

* The relative full time earnings shown in column (6) have as the base (100) the average of the years 1890–1899.

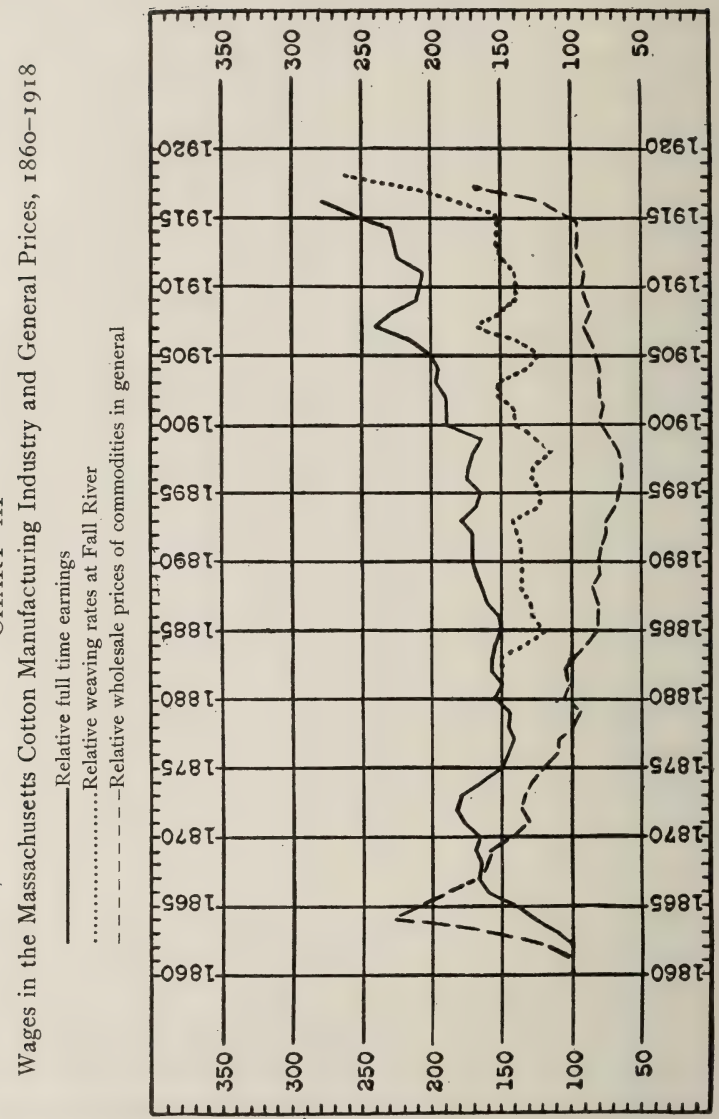
† The relative full time earnings shown in columns (2) and (7) have as the base (100) the quotations for January, 1860.

‡ As explained in the body of the text the series of index numbers of annual average weaving rates presented in column (6) of Table I has here been converted into a similar series having as the starting point for 1881 the index point 149, which corresponds to the point 149 in the series of relative full time earnings.

The base (100) of the series of relative wholesale prices of commodities in general is the quotations for the year 1860.

CHART XI

Wages in the Massachusetts Cotton Manufacturing Industry and General Prices, 1860–1918



From inspection of Chart XI it appears that relative full time earnings dropped from the high point of 183 attained during the greenback period in the year 1872 to the point 142 in 1877, and that the latter relative wage has been the minimum point since the close of the Civil War. And the long continued upward movement since 1877 reached in 1916 a point approximately 177 per cent above the base year 1860.

So much concerning the movement of full time money earnings, but what about real wages as measured by the purchasing power of the contents of pay envelopes over commodities in general? To help answer this question resort has been had to the index numbers of wholesale prices published from time to time by the United States Bureau of Labor Statistics.[1] These index numbers have been revised so as to make the relative price figures for 1860 the base of 100 for a new series, which is presented in columns (3) and (8) of Table XIX, and has served as the basis for plotting the broken or dash curve on Chart XI.

As is commonly known, the downward movement of wholesale prices from the highest point attained during the Civil War did not conclude with the resumption of specie payments, but was merely interrupted slightly in 1880, 1881 and 1882. In agreement with the general movement of prices in gold standard countries, the decline continued until in the United States the minimum point was reached in 1897, the index number for that year (using 1860 as the base of 100) being 63.6. After 1897 the price movement was steadily upward until in 1913, just before the outbreak of the Great War, the index number was 95.9 — not quite up to the level of the pre-war figure of 1860. War conditions since 1914 have resulted in bringing the index number well above the base line of 1860 to a point in 1917 (using annual average figures) about 68 per cent above the level of 1860.

Comparison of the curves of relative full time earnings and of relative wholesale prices of commodities in general plotted

1. Especially to Bulletins 149 (pp. 177, 178) and 181 (pp. 264-266) and to the November, 1918, number of the Monthly Labor Review (p. 88).

on Chart XI shows clearly that from 1867 to 1897, with the exception of the latter part of the greenback period not only was the purchasing power of the dollar increasing but the purchasing power of the contents of cotton mill employees' full time pay envelopes was increasing. And when, after 1897, the course of commodity prices became radically altered, the wage movement in the cotton manufacturing industry of Massachusetts kept very close pace with this changed movement. So that, making no allowance for fluctuations in the conditions of employment, it appears that the gain in real earnings secured between 1860 and 1916 is to be assigned to the years before rather than to those after 1897.

Finally, it is worth while to note the relationship between changes of piece rates and those of relative full time earnings. In column (6) of Table I (Chapter II) there appears a series of index numbers of annual averages of weaving rates at Fall River. The base (100) of this series in the weaving rate prevailing throughout 1881. In order to secure comparability of the data concerning weaving rates with those concerning the movement of full time earnings, the figures of column (6) of Table I, just referred to, have been converted into a new series, still using the year 1881 as a starting point, but calling this point 149 (the relative full time earnings figure for 1881, when 1860 is the base) instead of 100, and computing for each year since 1881 a new figure which has the same relationship to 149 as the corresponding figure of the old series had to 100. This new series is shown in columns (4) and (9) of Table XIX, and from it there has been plotted the dotted line curve of Chart XI.

With this curve added to the diagram there is made to appear in a striking way a phenomenon which may have passed unnoticed in the reading of the preceding pages. Although in the years succeeding 1881 until the time of the second sliding scale experiment the piece rate at Fall River fluctuated back and forth within a very narrow range of movement, the relative full time earnings climbed upward quite steadily. Even the strong upward swing of the piece rate in 1907 was of brief duration,

and not until the war conditions of 1916 were reached did the piece rate get very far outside the range of the preceding thirty-five years. In short, although there is a rather close correspondence between the minor fluctuations of the two curves, the general directions of their movements have been those of divergence. While it is not possible, because of the nature of the data studied, and especially because the piece rates are distinctly local and the data concerning full time earnings cover a wider field of investigation, and also because the series of relative full time earnings refers to both piece and time workers, to treat the evidence here presented as very conclusive, it appears not unreasonable to see in these figures and curves an indication of the beneficial effects to workers of improvements in technical processes; to consider that the introduction of new machines and new methods has in a very concrete way resulted in industrial gains which have to an appreciable extent been shared by employees; and at least to consider that the increase of real wages prior to 1897 and their maintenance since that date are not solely to be explained in terms of rates of wages or of hours of labor or of a combination of the two.

APPENDIX

THE TEXT OF THE SLIDING SCALE AGREEMENT OF MAY 14, 1907 [1]

It is agreed by the Cotton Manufacturers' Association of Fall River and the Fall River Mule Spinners' Association, the Fall River Weavers' Progressive Association, the Fall River Loom Fixers' Association, the Card Room Protective Association of Fall River and the Slashers' Union of Fall River that wages in Fall River, so far as the mills represented by the Manufacturers' Association and the operatives who are members of the above organizations are concerned, shall be determined in the following manner, which shall be binding upon the mills represented by the Manufacturers' Association and upon the members of the various operative associations until changed or terminated as hereafter provided.

1. That 21.78 cents per cut shall be the recognized standard price for a margin of 95 points, based on the cost of 8 pounds of Middling Upland cotton and the average selling price of 45 yards of 28 in. 64 x 64 print cloth and 33.11 yards of 38½ in. 64 x 64 print cloth. Quotations from the "New York Journal of Commerce" shall be considered authoritative.

2. The standard of wages shall be fixed every six months, beginning the last Monday in May and November of each year, and no oftener, and shall be based on the average margin, as fixed above, for the previous six months.

Prices for weaving shall be as follows:

1. Quoted verbatim from The Member's Contribution Book of the Card and Picker Room Protective Association of Fall River and Vicinity, pp. 16–18.

With a margin of		With a margin of	
115 points	23.96	85 points	20.69
110 points	23.42	80 points	19.66
105 points	22.87	75 points	18.68
95 points	21.78	72½ points	18.00

but there shall be no change in prices on either the ascending or descending scale unless the margin has reached a point named in the above schedule. Eighteen cents per cut shall be the minimum rate paid for weaving; 23.96 cents shall be the maximum. Wages in all departments other than weaving shall be adjusted on the price for weaving as above determined.

3. No change shall be made in this agreement and it shall remain in force unless the Cotton Manufacturers' Association on the one side or the members of the various operatives' organizations on the other side give notice of the proposed change at least three months prior to the last Monday of May and November in each year.

ACCEPTED BY THE
DEPARTMENT OF ECONOMICS AND SOCIAL INSTITUTIONS
JUNE, 1916